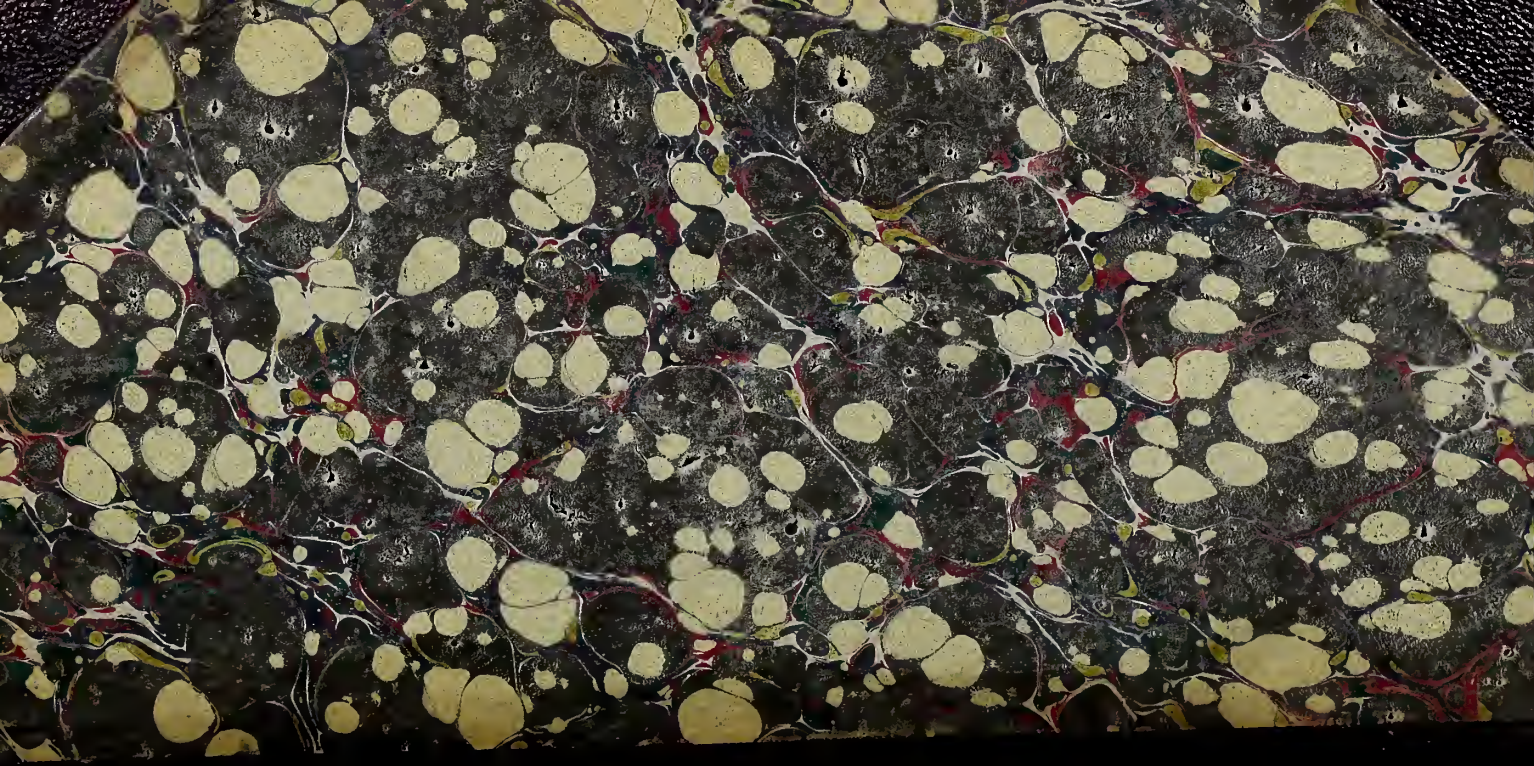

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Examination and Analysis of a Coal from Cherra Punji, received from Messrs. GILMORE *and* McKILLIGAN.—*By* H. PIDDINGTON, *Esq. Curator, Museum of Economic Geology.*

This coal is, on one fracture, a fine bright glance coal. On the cross fracture it is hackly and resinous, and wherever faint lines of stratification can be traced they are again crossed by lines almost perpendicular, though the coal shows no tendency in its fragments to divide cubically, but rather in beds and thick laminæ.

When either the powdered or solid coal are exposed to heat in a closed crucible, it is found that they swell up in coking to a curious bright black puffy and froth-like mass, which fills the whole crucible, and is exceedingly tender and brittle. This singularity distinguishes it from all other coal, of which we have any record available here.

It crackles and flies a little in the forceps, and then flames and burns up in long gas-like jets.

The smell of the smoke is that of good Newcastle coal, and has nothing disagreeable or peaty about it.

Its Sp. gravity is,	1.24
Its constituent parts are,	
Water,	00.85
Gaseous matter,	66.00
Carbon,	32.65
Ash (dark grey),	00.50
	100.00

It would thus appear, so far as laboratory experiment can guide us, that this coal is a first rate gas coal, but would not give a coke applicable to any present known use, the coke being in fact a black carbonaceous froth.

As a steam coal, unless it be perhaps with tubular boilers, it would not be found an economical one; as though from its rapid flaming, the steam would be quickly raised, yet from the large proportion of gas, much of it would be unconsumed, and driven up the funnel or chimney, and the proportion of carbon (coke) is too small to keep up a long steady glowing heat, without a fresh supply of coal. If it is used for steam in common furnaces, the most economical method of using it, would probably be to burn two-thirds of Burdwan or other inferior coal to one of this kind.

On communication of these results to Messrs. Gilmore and McKilligan, they shewed me a report from Mr. Ward of Messrs. Jessop & Co. stating that they had found that the coal coked well! Supposing some error, I repeated my own experiment, and obtained from Mr. Ward some of their coal, and of its coke, which was very fine and the coal evidently from the same seam; but upon trying some of it in the same (silver) crucible over a lamp furnace, it produced only the puffy mass, like my former result. I called on Messrs. Jessop to compare notes, and they informed me that from 2 maunds 35 seers of the coal, they had obtained but one maund of coke, or rather less, since it was weighed when damp. This is very nearly our proportion of 33 per cent of carbon and ash, for 100 : 33 : : 115 : 37,73, which was about the true weight of Messrs. Jessop's coke.

The singular fact, however which it teaches us, i. e. that with highly gaseous coal, the same result is not produced on a small scale as on a large one, is highly interesting; and thinking it might be owing to the too sudden application of heat, from the lamp furnace heating the silver crucible quickly to redness, I tried graduating the heat very slowly but without success; so that this is not the cause of this extraordinary difference of results.

Description of a new species of Hornbill, by Capt. S. R. Tickell, *Principal Asst. Commr. Tenasserim provinces.*

Buceros [Tickelli, Blyth].

Sex—Female, nearly adult? Eastern base of Dauna hills. District of Amherst, Tenasserim provinces.

Dimensions.—Length 22¾ in.; spread 31 in.; wing 1 in; tail 11¼ in. (beyond wing 7½ in.); bill 4 9/16 in.; tarsus 1 13/16 in.; m. toe 1½ in; greatest vertical depth of bill and casque 2 in.

Details.—Bill resembles with its casque the bill and casque of young B. birostris. Edges serrated as if eroded, but meeting throughout the length of bill. Casque compressed into a keel-like process, rising rather abruptly from the forehead, and then inclining downwards and forwards with the arch of the bill, with which it amalgamates at about 2 in. from top. Nostrils opening upwards, and pierced in a flattened ridge. Chin and throat feathered except close to bill. Tail pretty long and rounded, centre exceeding outer feather by 1¾. For the rest the details are typical, the form and proportions resembling those of B. birostris, the common "Dhunnès" of India.

Colour.—(Female.) Iris grey, with an inner circle of brown. Bill dark horn, basal half of casque dull orange: orbits nude and dull pale smalt-blue. Legs dark greenish-horn, with pale soles. Head and its blunt occipital crest bistre-brown, the feathers shaftally pale. Upper-parts umbre-brown, dull and opaque, with a slight tinge of olive, and glances of dull green in certain lights. On the remiges this colour darkens, the secondaries and primaries being greenish-black, the latter with their outer margins midway and their tops whitish. Tail, 2 centre feathers as back, with pale tips: the rest greenish black with pale tips. All under-parts rufescent-tawny, brightest on throat, dull and clouded with vinous-ashy below. Auriculars striated bistre, as are sides of neck obscurely. Lining of wings dusky and tawny.

From the written description of the casque and bill of Buceros galeritus (*Journal As. Soc.* for 1845, No. 159, p. 187), I was led to identify the present subject with that species, but am assured

by Mr. Blyth that they differ. The species now under review is therefore new to science.

The district of Amherst (Tenasserim provinces) is traversed for its whole length, north and south, by a continuation of the Yoma-donng or south-eastern Himalaya. This range continues southward through Tavoy and Mergui, and forms finally the backbone of the Malayan peninsula. And along these mountains birds supposed to be peculiar to the peninsnla and the Straits on the one side, and restricted to Nepal and the Mornng and Teraii on the other, are frequently met with. The range (or ranges) in Amherst are about forty miles in breadth (though the monntainons portion of the province seems to dilate as extending southward), and the ridges are for the most part excessively steep, and bnried in forests: but rising to more scantily clothed peaks of 7 or 8000 feet elevation. On the lower skirting hills, but especially on the plains at their feet, the soil, watered by numerous brooks and streams, is exceedingly rich, and nourishes trees of prodigious dimensions. The "Thengan" (*Hopea* tree, apud Jndson), "Toung-bing," and "Kathy-kha" (trees used by the Talyns for making boats of upwards of 50 tons burden), rise to 150 ft. before prodncing a branch, their summits attaining a height of 230 feet and upwards; and it is on these giants of the forest that this species of Hornbill reposes and feeds, never being met with in jungle where the trees are of an ordinary size. I met with these birds from the plains up to an elevation of 3,500 or 4,000 ft. above the sea, bnt not beyond; and they appeared commonest on the easterly skirts of the range, keeping together in pairs or small parties of five and six, incessantly calling to each other in loud plaintive screams "*whé-whéyo, whé-whéyo,*" and when feeding, keeping up a low murmuring cackle like Parrots. Their flight is smooth and regular like that of Buceros pusaran, not in alternate flaps and sails like B. cavatus, or albirostris, or birostris. And it is performed at great elevations especially when they cross from top to top of the monntains. Keeping ever thus at immense heights, and being withal as quick-sighted and wary as the rest of the genus, it may be pronounced one of the most difficnlt birds in the world to be procured with a gnn. It is, therefore, no matter of wonder, that although large collections of birds have been made in the Tenas-

serim provinces, this Hornbill has never hitherto formed part of them. Amongst the individuals I could see, but not shoot, some were apparently entirely black, and these may be the adult males. The wild Karens who lived nearest to those uninhabited forests knew nothing of the bird.

On a simple method of Manipulation in the Calotype process.—By J. J. Gray, *Esq. Maldah.*

In the description of the following process I make no claim to originality, it being merely an adaptation of Fox Talbot's process to suit the requirements of an Indian climate, the mode of manipulation being so simplified that, with ordinary care, failure will be impossible.

Paper.—I prefer Turner's negative calotype paper to all others I have tried.

Iodizing.—I always iodize by the single-wash process, sometimes first washing the paper with a solution of chloride of barium, 12 grains to the ounce of distilled water. I have also used bromide of potassium, but cannot say that I have noticed any particular benefit from its use.

To iodize the paper, the following articles are required:

A sheet of "solah," cork, or soft wood, larger than the paper to be iodized.

A double fold of clean flannel, or sheets of clean blotting paper.

Silver pins, which can be made in any bazar.

A couple of Buckle's brushes, or, what is quite as good, the neck of an Eau de Cologne bottle, with some cotton-wool and a bit of thick thread.

A couple of large dishes, or trays, of glass, wedge-wood ware, or gutta purcha filled with water.

The iodizing solution.—To make which, I quote Dr. Diamond in the 11th No. of the Journal of the London Photographic Society.

Take sixty grains of nitrate of silver, and sixty grains of iodide of potassium, dissolve each separately in an ounce of distilled water, mix and stir briskly with a glass and so as to ensure their perfect mixture; the precipitated iodide of silver will fall to the bottom

of the vessel; pour off the fluid, wash once with a little distilled water, and add 650 grains of iodide of potassium, which should perfectly re-dissolve the silver and leave a clear fluid; should it not (for chemicals differ occasionally in purity) then a little more should be added, until the effect is produced.

Select the sheets to be iodized, carefully rejecting those in the slightest degree damaged or defective; mark the smoothest side with a pencil in one corner, lay the flannel or blotting paper on the solah board, lay the paper marked side uppermost on the flannel and pin it down at the four corners with the silver pins; now dip the cotton brush into the iodizing solution, incline the board and commencing at the top of the sheet; lay on the wash with a steady hand as in laying on a flat tint in water colour painting, taking care that none of the liquid runs, turn the board, and cross the first wash with a second at right angles being careful to obliterate all air bubbles and not to leave an excess of liquid, so as to pool when laid on its back; unpin and lay the sheet on its back on any clean flat surface to dry. Commence upon a second sheet and so on until the requisite number are finished, which depends upon the depth of the dishes used for washing; before the sheets are perfectly dry immerse them carefully in dish No. 1, putting them in one by one, and getting rid of air bubbles by blowing, gently agitate the dish for a few minutes, then change separately to dish No. 2, repeat the agitation, re-fill No. 1, with clean water and shift back the papers, and so on changing the water half a dozen times or until the dripping from the sheet cause no precipitate in a solution of nitrate of silver. I generally find from four to six changes in an hour suffice. The sheets should now be of a pale primrose colour of an even tint on the face, with scarcely any trace of colour on the back.

They are now to be lifted out separately and hung up to dry, pins are apt to tear large sheets, the best plan is to throw them across a wooden rail over which sheets of any clean paper, covered with clean towels have been hung. When dry, they can be put away in a portfolio for use. The whole of this operation may be performed in moderate daylight, and the dry paper may be exposed to the full force of the sun with benefit.

To Excite.—I here diminish the strength of the exciting solution as the heat of the weather increases.

The normal solutions are as follows:—

No. 1.

Nitrate of silver,	30 grains.
Glacial acetic acid,	1 drachm.
Distilled water,	1 ounce.

No. 2.

Gallic acid,	10 grains.
Glacial acetic acid,	½ drachm.
Distilled water,	6 ounces.

The addition of the acetic acid enables us to keep the gallic acid any length of time without decomposition.

Take 10 minims of No. 1 and 10 minims of No. 2 mixed with 3 drachms of distilled water (this is just enough for a sheet 10 by 12 inches) pin the iodized paper face upwards on the solah board as before with clear silver pins, dip a clear Buckle brush in the gallo-nitrate solution, and lay on the wash as described in the iodizing process, lay the board on its back out of the light of the candle for about a minute, then unpin the paper take it up by a couple of corners, and lay it carefully, face downwards, on a dish of clean filtered water, taking care not to wet the back; agitate the dish gently for a few minutes, lift up the paper, allow it to drain for a few seconds and lay it on its back on a clean dry surface, blot off with a fresh sheet of blotting paper, and put it, while still damp, in the dark frame. With a little management, four sheets can easily be thus excited at one time.

If the weather is warm, reduce the quantity of gallic acid to 4 minims.

If the weather is hot, omit the gallic acid altogether, and a second washing may be given to the paper, if it is required to keep long.

Exposure.—It is impossible to give any safe guide in this part of the process as no two lenses work alike. The shortest exposure I give is 3 minutes, and I have given as much as 15 according to the light.

Development.—Here again I graduate the strength of the solution according to the heat of the weather, or the appearance of the paper when taken out of the dark frame.

In cool weather, and when no trace of the picture is visible on the paper, I use equal parts of the acito-nitrate and gallic acid as in the normal solution.

As the weather gets warmer or the picture appears more or less on the paper, I decrease the quantity of aceto-nitrate, substituting the gallic acid. This developing solution is laid on exactly as in exciting with a clean cotton brush, the paper being kept wet until the development is complete, and the minutest detail visible. Then unpin the paper and wash in a couple of waters in a dish, after which it may be put into the hypo-sulphate of soda solution (1 oz. to 6 oz. of clean water) and taken into the light. When the picture has lost all trace of the yellow iodide of silver it is fixed and must be immediately washed in many waters for several hours, dried, and finally waxed for the printing process.

Let me add a few cautions to beginners. In iodizing, be careful that the fingers are free from nitrate of silver stains; I have spoiled a whole batch of papers by neglecting this.

See that not a trace of daylight is admitted into the operating-room, the single candle even must be shaded, the light may be allowed to come through the window however, if guarded by a double fold of American sheeting dyed with the wood of the jack-tree.

Should the paper turn brown in spite of all precautions, be assured the glacial acetic acid is too weak; therefore increase the quantity.

Carefully wash out all the vessels used, more especially those in which the gallo-nitrate has been mixed.

Keep the hypo-sulphate of soda at a distance from all the other chemicals, and set separate dishes aside for its use, two solutions will serve to fix many proofs if filtered before use, even after it has become quite black.

A clean flock of cotton-wool must be used for each picture, and for each purpose in the Buckle brush.

I think that the above reduces the calotype process to a simplicity, which can hardly be exceeded: it is also an exceedingly economical one, a matter of no small importance in India, where chemicals are often not to be had, and are sold at such extravagant prices.

Report on a Zoological collection from the Somáli country.—By E. Blyth.

The collection on which I have now the honor to report was made by Lt. Speke, of the 46th B. N. I., and was forwarded to the Society's Museum by Lt. Burton of the Bombay Service, in command of an expedition into the Somáli territory, or African region bordering on the Red Sea.*

This collection comprises 10 species of mammalia, 36 of birds, 3 of reptiles, 1 fish, a scorpion, and 3 species of *Coleoptera*. The whole of the *Vertebrata* (if not the rest also) being distinct species from any found in this country; save only a Lynx (Felis caracal), and a Wheatear (Saxicola melanura, Temminck), which latter is figured among the Burnes' drawings from Sindh, though we did not previously possess an example of the species.

The actual novelties are not many; but comprise a highly interesting rodent, in a new generic form affined to the hitherto isolated African genus Ctenodactylus, Gray; and among the birds, a second species of the *Sturnidous* genus Spreo, a handsome undescribed true Sparrow, and a small Floriken remarkable for the shortness of its tarsi. There is also a *Sturnidous* bird, which is probably the Lamprotornis morio apud Rüppell; but is quite distinct from the species so denominated of S. Africa, from which it is now probably first distinguished.† A *Bayá* (or 'Weaver-bird') sent would seem to be the long lost *Baglefecht* of Buffon, which the older systematists confounded with our Indian Ploceus philippinus, and in Griffith's edition of Cuvier's 'Animal Kingdom' is placed as a synonyme of Euplectes abyssinicus: and a beautiful small Honeysucker (Nectarinia albiventris, Strickland, described from the Somáli country,) is now probably only for the second time received in any collection. The reptiles comprise an apparently new Scinque.

* *Vide* p. 245, *ante*.

† Since the above was written, we find (from a recent No. of the *Comptes Rendus*) that this Abyssinian bird has lately been discriminated by M. Verreaux, who terms it Amydrus Ruppelli.

With the exceptions of Felis caracal and Oxylophus glandarius, the whole of the species would have been new to the Society's museum, had we not just previously received the collection from Dr. Rüppell noticed in my Report for April of this year;* and which supplied us with examples of Canis variegatus, Dendrobates æthiopicus, Saxicola isabellina (?), Platysteira senegalensis, Nectarinia habessinica, and Pterocles senegalensis: but in all of these instances the examples prepared by Lt. Speke are finer, and he has favoured us with both sexes of the Pterocles.

As acquisitions of especial interest may be indicated the Hyæna, the Abyssinian Hyrax, the little Salt's Antelope (a particularly fine and well prepared specimen), and the new rodent; and among birds the *Bateleur* Eagle, the Hornbill, two species of Promerops (a genus intermediate to Buceros and Upupa), the Chizæris, Corvi, Buphaga, Laniarius cruentus, Hyphantornis baglefecht, the *Rasores*, new Floriken, and Chenalopex or 'Egyptian Goose,' of which common African bird we did not previously possess a specimen.

In proceeding to details, we distinguish by inverted commas some notes obligingly supplied by Lt. Burton.

MAMMALIA.

Canis variegatus, Rüppell. "The Somáli Jackal (male), fine and large: probably on account of the quantity of Sheep's tails which he has devoured. He carries off kids and lambs, rather disdaining garbage; and unless driven away by dogs, he is capable of doing great damage to the flocks. The Somáli call him *Dowao*, دواو."

*Hyæna crocuta? (Erxleben), var.? Bright fulvous Hyæna, with dark spots not very distinct, and a black tail-tip: probably of the race termed H. crocuta rufa by Fischer, and which Dr. Gray refers to H. brunnea, Thunberg (*H. rufa*, Cuv., and *H. fusca*,† Geoffroy), from S. Africa (Pt. Natal); but which is not the 'Strand Wolf' of the Cape colonists (who term the common Spotted Hyæna the 'Tiger Wolf'), or H. villosa, A. Smith, which Dr.

* *Vide* p. 252, *ante*.

† This name more probably refers to the specimen in the Paris Museum described by Cuvier, *Oss. Foss.* VII, 318 (4th edit.), and which is evidently H. villosa, A. Smith (*Lin. Trans.* XV, pt. 2, 461).

Gray considers to be a S. African variety of H. STRIATA, Zimmerman, the common Striped Hyæna of Asia and N. Africa. We have seen H. VILLOSA alive, and have minutely compared its skull with skulls of the Spotted and of the Striped Hyænas; and arrived at the conclusion that it was a distinct species, nearly affined to H. STRIATA, but with the solitary true molar less developed, though more so than in H. CROCUTA.* Dr. Gray even institutes a genus CROCUTA, to which he refers as species CR. MACULATA *(Canis crocuta*, Erxleben, *Hyæna maculata*, Humb., v. *H. capensis*, Desmarest), the ordinary Spotted Hyæna, and Cr. BRUNNEA (with synonymes as before cited). The Somáli animal is probably the latter. The specimen is a female. "The Somáli call it *Waraba*, ورابا or *Durwa*, دروا. It is common to all the Somáli country, whines about the camp all night, and devours anything it can find during the day, pulling down camels and even children. The natives have many superstitions about this animal, and you often hear of a man being called *Waraba* after his proper name; the idea being that by rubbing certain plants over the body the magician can convert himself like Mars into a Wolf. In the cold season when the Waraba is hungry he attacks man. The Somális all declare this animal to be a hermaphrodite, copulating and being copulated with alternately." *(Vide* Pliny, VIII, 30; as cited by Cuvier, *Oss. Foss.* VII, 312, 4th edit.)

* MUNGOS FASCIATUS; *Herpestes fasciatus*, Desmarest: *Viverra mungo*, Kæmpfer; *V. ichneumon*, Schreber (from Buffon, III, t. 19); *H. zebra*, Rüppell; *Ryzæna suricata* apud Children, 'Appendix to Clapperton's Travels'). "Called the *Kadaf*, كدف. These animals run about in large batches, and defend themselves savagely when wounded. They inhabit the plateau, burrow deep, and when pursued endeavour to escape by hiding themselves: yet with characteristic curiosity, they must peep out of their asylum after a few minutes' concealment."

FELIS CARACAL, Schreber. "Called by the Somális *Jumbil*, جمبيل. It is principally found in the plains."

*XERUS RUTILANS; *Sciurus rutilans*, Rüppell: *X. brachyotus*, Hemprich and Ehrenberg, apud Gray. "Ground Squirrel, called *Dabakálla*, دبكالا. It abounds all over the country, burrows especially

* Vide also Cuvier, *Oss. Foss.* VII, 319 (4th edit.)

into deserted ant-hills, and under dead trees. The testes of the male are enormous; and the colour of the coat is glossy and brilliant."

*Pectinator *(n. g.)* Spekei, nobis, *n. s.* "Common Rat. *Barabdubl*, بربدبل. Inhabits stony ground, like the Hyrax." This highly interesting rodent belongs to a peculiar N. African group, of which one species only appears hitherto to be tolerably known, the Ctenodactylus Massonii, Gray.* The animals of this group are clad with delicately soft fur, have very long moustaches, and four toes only on each foot. The palms and soles are naked, the latter to the heel or tarsal joint; and the entire length of the tarse is brought to the ground when walking. Over each claw is a curving tuft of stiffish bristles, more conspicuously developed on the hind-feet; and the innermost toe of the hind-foot has a peculiar combing apparatus, which has been described by Mr. Yarrell in the instance of Ctenodactylus Massonii. "With this comb-like instrument," remarks that naturalist, "the little animals were observed [in the London Zoological Garden] to be continually dressing their soft fur; and the facility with which they managed to reach every part of each lateral half with the toe of the foot

* Vide a notice of the anatomy of this animal, by Mr. Yarrell, in *Proc. Zool. Soc.* 1831, p. 49. A second species would seem to exist in the *Mus gundi*, Rothman, or *Gundi Marmot* of Pennant's 'Zoology;' which, being described to be of the "size of a small Rabbit," and of a "testaceous-red colour," can scarcely (as remarked by Dr. Gray) be specifically identical with Ct. Massonii, even though from the same country—Barbary. The fur of Ct. Massonii is pale yellowish-brown; and its tail is described by Mr. Yarrell to be 1 in. long. The *Gundi* is merely stated to have a "short tail." Accordingly, the following (obviously another of the same group and region), with rudimentary tail "but just perceptible to the touch," is probably a third species, which was observed by Capt. Lyon in the mountains north of Tripoli. That traveller informs us, that—"It much resembles a Guinea-pig in form, but is of a light brown mouse-colour. Fur longer than that of a Rat, and very silky; eyes black, large, and prominent. Orifices of ears, which are quite flat against the sides of the head, also black, and free from hair: the tail, or rather a little stump in place of one, is just perceptible by the touch, and from it grows a tuft or buuch of long black hairs. The body is very round and fat, and particularly broad at the shoulders. These animals burrow amongst the rocks. They are eaten with great relish by the natives, and no doubt are very good, as the flesh is exceediugly white and fat, and resembles that of a Rabbit." 'Travels in Barbary,' p. 32.

on that side, as well as the rapidity of the motion, were very remarkable." The muzzle is completely furred; and the rudimentary or short tail is furnished with long hair (as in the Sciuridæ). The rodential tusks are narrow and rounded; and in Ctenodactylus there are only three molars on each side above and below, and which are surrounded with enamel; the upper having one deep indentation externally, the lower being indented on both sides. In our new genus there is a small and simple fourth molar anteriorly above and below; and the next to it above is smaller than the third and fourth, and seems to have no distinct indentation (the molars being, however, much worn away by attrition in the specimen examined). The lower jaw of Pectinator is very remarkable for shewing no indication even of a coronoid process; a fact not mentioned by Mr. Yarrell in his description of the anatomy of Ctenodactylus. The condyle is small, and articulates on a level with the crowns of the molars. The auditory bullæ are remarkably large, and are seen from above (as in Chinchilla).—The ant-orbital foramen is large. Palate contracted, narrowing to the front; and the post-palatal emargination is continued forward to a line with the middle of the last molar. Externally, Pectinator is distinguished from Ctenodactylus by having the tail and ear-conch well developed; a smaller eye; and apparently a general adaptation for more diurnal and less fossorial habits. The eyes are scarcely so large as in a common Rat. The auricles are broadly ovoid, sub-nude, with a fringe of whitish hairs on their anterior margin, and a patch of dense whitish fur at base on their outer surface. Length of P. Spekei, from nose to base of tail, about 6 in.; and tail probably $2\frac{1}{4}$ in., or with hair $3\frac{1}{4}$ in. Tarse with toes $1\frac{3}{4}$ in. Auricle (measured posteriorly) $\frac{1}{2}$ in. The skull measures $1\frac{7}{8}$ in. in length, and $1\frac{1}{16}$ in. in greatest breadth (at the *zygomata* posteriorly); between the orbits somewhat exceeding $\frac{1}{2}$ in. Fur soft and moderately long, of a sandy grey-brown colour, slightly washed with rufous especially on the crown; the basal half of the piles pale dusky: at the *nates*, the fur is more dense and woolly, and rufescent-whitish or pale isabelline: the moustaches are chiefly black, and the longest of them measure about 3 in: the hairs upon the tail are shorter towards its base, then lengthened as in the Squirrels; these long hairs being of a

sullied or isabella-white for the basal half, and then black with a white tip: hence, in the living animal, the bushy tail would appear whitish along its middle, with broad black lateral and longitudinal bands, which again are fringed externally with dull white: hairs upon the feet whitish, the tufts or brushes over and impending the hind-claws shewing conspicuously: the combing apparatus of the innermost hind-toe consists of some exceedingly harsh and stiff short bristles immediately impending (but shorter than) the claw, and above these again are some equally short bristles which are not quite so rigid; over which is finally the long incurved tuft of finer bristles, the lowermost of which are shorter and more rigid than the upper: on the next toe the same remarkable structure is seen, and more easily *felt*, but is considerably less developed.*

*Hyrax habessinicus, Hemprich and Ehrenberg: *Ashkoko* of the Appendix to Bruce's Travels; recognised as a distinct species by Dr. Gray; but referred by Dr. Rüppell to H. damar, Cuvier, v. syriacus of Schreber. Half-grown specimen. "The Somál call it *Bauni*, بوني. It inhabits rocky ground and delights in sunning itself, running about the rocks, and living in chinks and holes. Neither Lt. Speke nor I ever saw it in the plains. The Arabs here eat it, but the Somál do not."

*Gazella ——— ? Heads of male and female, of one of the

* This discovery of a second generic form of a peculiar group, hitherto represented only by Ctenodactylus (which has long stood quite isolated among other *Rodentia*), will be hailed with some satisfaction by those who have paid attention to the classification of the Order, and will tend to remove such doubts as may exist of the propriety of recognising this as a separate family (however limited, according to present knowledge), about equivalent to the Chinchillidæ of S. America, to which, upon the whole, the Pectinatoridæ would seem to be more nearly affined than to any other known form. It is highly probable, however, that more species and even generic forms remain to be discovered of this peculiarly African family; and that it will prove to be at least as extensive as the Chinchillidæ; and perhaps that even Petromys should be admitted within its extreme confines. Capt. Lyon's Tripoli animal, with tail reduced to a mere tubercle, is certainly one species which has not yet been scientifically examined; and the *Gundi Marmot* of Pennant is probably another: but these little mouse-coloured rodents seldom attract the attention of unscientific collectors; unless, indeed, it should so happen that their attention had been especially directed to them.

several species which have been more or less confounded under G. DORCAS; and quite distinct from the common Aden Gazelle, which is frequently brought alive to Calcutta. One marked peculiarity consists in the ears being of an ash-grey colour, contrasting strongly with the hue of the neck and doubtless also of the body. Horns robust, curved backward and then upward, and diverging but slightly; much longer, and with the annuli wider apart, than in the Aden Gazelle, though the animal would seem to be of the same size. The horns of the female are very much stouter than we have seen in any other female Gazelle, and follow the same curve as in the male, having rudimentary annuli. Muzzle whitish, with a strongly contrasting black nose-patch. The Society possesses a species of Gazelle (habitat uncertain), which much resembles the Aden Gazelle except in being considerably larger, with proportionally longer and more distantly knobbed horns, much as in the present race: but both of these have the ears rufescent and not ashy. At present, we are far from being satisfied with the manner in which Dr. Gray has brought together sundry of these affined races of Gazelle, in the *Proc. Zool. Soc.* for June 11th, 1850 (*Ann. Mag. N. H.* VIII, 1851. p. 131). It seems like cutting rather than unravelling of the tangled knot. Lt. Burton writes—"A kind of Gazelle called by the people *Dera*, ديرا; as you may observe that there is an elevation of loose replicated skin upon the nose. It seems to live during the dry season without water, and affects the desert, not being very shy in presence of man, but avoiding jungle. They are found in flocks."

*MADOQUA SALTIANA; *Antilope saltiana*, Blainville; *A. madoqua*, H. Smith. A beautiful skin of a male; and heads of two other males and of a female. "This little Antelope is called *Sagaro*, ساگارو, by the Somál; *Beni Israel* in Abyssinia; and *Ghazalah* by the Arabs. It abounds throughout the country generally in pairs, and is fond of ravines under hills, the beds of nullahs, and patches of desert vegetation. In the northern Somáli country, these Antelopes are caught in snares: elsewhere they are run down on foot, taking half a day on account of their great swiftness. The Jackal (CANIS VARIEGATUS) cannot catch them. They sleep by day under the trees; and in the plains their dung (which becomes peculiarly fœtid with a musky odour in the sun) is found in heaps as if they

assembled for that purpose." Many animals resort habitually to one place to deposit their dung: among them the Indian Rhinoceros, which in the Rajmahal hills is watched for and shot by the natives at such places; and we have observed the Indian Four-horned Antelope to exhibit the same propensity, when tame and loose in a large enclosure.

*Oreotragus saltatrix; *Antilope oreotragus*, Forster: *A. saltatrix*, Boddaërt. The '*Klip-springer*' of the Cape colonists. Head of female, and one fore-foot. "A kind of Antelope called *Alakrut*, الاكرت. They live in the higher ranges of the mountains, only in pairs, and are not unlike the Musk-Deer in coat. They are by no means shy, seldom flying before the foot-fall is heard. They hop in an awkward manner on the points of the hoof, at no great pace or distance at a time. The people of the country prize the venison."

AVES.

Pœocephalus rufiventris, (Rüppell). "The only species of Parrot observed in the Somáli country. These birds fly in considerable numbers; and they have red irides."

*Helotarsus ecaudatus, (Daudin): *Bateleur* of Levaillant. "Called *Nabodi*, نبودي. There are many superstitions about this bird, and its shadow is supposed to be injurious to children. This may be accounted for by the habit it has of swooping down upon any one carrying meat. It devours the small Antelopes and birds, and generally soars high, but I have seen it wheeling close overhead. The female lays one egg in a large loose nest of sticks on the top of tall trees, and if the egg be taken she abandons her home. Irides red."

*Melierax polyzonus, Rüppell. "A kind of red-eyed Sparrow-hawk, very swift. The people call it *Hatkaadag*, هاتكادگ."

*Bubo (?) africanus, (L.), Temmink, *p. c.* 50. Called *Shimír libah*, سمرلباة, the "Lion-bird." This is probably the species so identified by Rüppell, though not well according with the descriptions to which we have access. Size of ordinary Asio (v. Otus), but the auditory aperture as in Bubo. Length about 16 in.; of wing 12 in.; and tail 7 in. Colour rufous-brown above, speckled and variegated with dull black, and some oval white spots bordering

the scapularies and upon the wings: lower-parts barred with narrow transverse dusky rays, each margining a broader rufous band; tarse almost spotless dull white: primaries and tail banded. Head and neck (with aigrettes) rufous, each feather having a terminal blackish spot, extending up more or less as a medial streak: facial disk black-tipped; and the radiating plumelets whitish, tinged with rufous.

*Buceros (Tockus, Lesson,) flavirostris, Rüppell. "A common bird, called by the Somál *Kudunkutu*, كدنكطو. He makes a loud quacking noise, not unlike a frog; is fond of the jungle trees, and is noisy about sunrise."

*Promerops senegalensis (?), Vieillot: *Nectarinia melanorhynchos* (*?*), Licht. "A bird with an offensive smell; flies in flocks, and feeds in acacia trees. It is numerous on the plateau." This is distinct from the Cape species, Pr. erythrorhynchos, (Latham); but may perhaps be the Abyssinian bird which Dr. Rüppell refers to the latter (*Systematische uebersicht*, &c., p. 28). Beak black, but red internally: not much curved, and measuring $2\frac{3}{8}$ in. (in a straight line) from gape to point: wing $5\frac{3}{4}$ in.; and middle tail-feathers 9 in. The white spots on the wings and tail are considerably more developed than in the Cape species, and extend quite across six of the primaries, without being divided by black along the shaft of the feather. The coloured glosses also are less splendid than in the Cape bird, save chiefly on the throat.

*Pr. minor, Rüppell. Two specimens, male and female; the latter having a considerably smaller and still more arched bill. "This bird makes a loud noise, and inhabits large trees, especially the acacias."

Dendrobates æthiopicus, (Ehrenberg). "Heard tapping the hollow trees, like the Woodpeckers of Europe. These birds abound on the plateau. They are called *Daudaulay*., دودولي, from the sound."

*Dendromus Hemprichii, Ehrenberg). "This small Woodpecker is commoner than the last, and also inhabits the plateau."

*Chizæris leucogaster, Rüppell. "Called in some parts of the country *Gobiyan*, گوبيان; in others *Fút*, فات. It is a noisy bird, with a loud cry, and has all the cunning of a Magpie when pursued. It is fond of the thick trees on the banks of ravines. The Arabs call this bird *Kakatua*, and consider it a species of Parrot."

Oxylophus glandarius, (L.) "Only this specimen obtained."

*Corvus affinis, Rüppell. Two specimens. "Common all over the country. Somáli, *Tukka*, ﻙ.

"In the Harar hills I remarked another variety, very large, with a bright white patch on the back of the head, and a tremendous beak, arched and exceedingly hard. It is a very strong bird, taking a powerful load to kill: my Somális had never seen it before." The Corvultur crassicollis, Rüppell, is here intended.

C. umbrinus (?), Sundevall. Not having seen a description of this bird, we are not quite certain that it is correctly identified; especially as the late H. E. Strickland remarked of it, after noticing C. scapulatus (phœocephalus, Cabanis),—"Distinguished by the length and curvature of the beak, and by the grey-brown tint of the head and neck." In the Somáli specimen under examination, the beak resembles that of C. scapulatus; and there is a further general agreement of size and structure, extending to the shape of the feathers. The bird was evidently young, and a dull brown tint prevails on the plumage, especially on the head and neck, which might well have suggested the appellation *umbrinus*. Can it, however, be the *young* of C. scapulatus? Lt. Burton writes—"A common Crow. *Sometimes the breast-feathers are tipped with white, in small semi-circles extending as far as the abdomen.* The Somáli do not distinguish between this and the other Crow." On the other hand, may it be a variety of C. scapulatus, as C. corone is certainly a black variety of C. cornix,† and as the black variety of C. splendens which inhabits Burma?

*Amydrus ruppelli, Verreaux; *Lamprotornis morio* apud Rüppell, but distinct from A. morio, (L., *verus*), of S. Africa. Male and female. As compared with fine specimens of both sexes of the Cape species, this bird has a shorter and deeper bill, with more arched upper outline; longer wings; and much longer tail: but the colouring of the plumage is nearly the same; except that in the female of the northern bird, the head, neck, and breast, are paler and *unmixed* ash-gray; and in both sexes there is much more black tipping the primaries. Both have the rudimentary first primary black; but in the Cape species, the rest have both

* *Ann. Mag. N. H.* IX (1852), p. 345.

† We possess an intermediate specimen from Norway.

webs rufous to very near the tip; whereas in the northern bird, the black is continued along the outer web to near its emargination, and also far up the margin of the inner web: in the second (or first developed) primary of A. Ruppelli, the outer web has its terminal $\frac{3}{5}$ black, and the inner web its terminal $\frac{2}{5}$, the two colours being distinctly defined apart; whereas the corresponding feather of A. morio is rufous throughout, passing insensibly into weak dusky at tip, and along the margin of the inner web. In A. Ruppelli, the length of wing is—male 7 in., female $6\frac{1}{2}$ in.; middle tail-feather—male 8 in., female $7\frac{1}{4}$ in.; bill to gape $1\frac{1}{4}$ in., and fully $\frac{3}{8}$ in. in vertical depth. The corresponding measurements in A. morio are—6 in. and $5\frac{3}{4}$ in., $5\frac{1}{2}$ in. and 5 in., and $1\frac{3}{8}$ in. by $\frac{5}{16}$ in. "This bird is found all over the hills, follows the cattle, and flies in flocks seldom exceeding 6 or 7. The eye is dark."

*Lamprotornis superba, Rüppell. "A kind of *Maina*, called *Lhimber-load*, لمبرلواد, the 'Cow-bird.' It is found in large flocks, and is fond of cows, whence its name. Irides white."

*Spreo albicapillus, nobis, *n. s.* Length about 12 in.; of wing $6\frac{1}{4}$ in.; and tail $4\frac{3}{4}$ in., its outermost feathers $\frac{3}{4}$ in. shorter: bill to gape $1\frac{3}{16}$ in.; and tarse $1\frac{3}{8}$ in. Colour dull metallic green, with a white cap, vent, lower tail-coverts, tibial plumes, flanks posteriorly, axillaries, and under wing-coverts: rest of the lower-parts with narrow brownish-white mesial streaks to the feathers, which are subacuminate, and but slightly streaked on the chin and throat: secondaries chiefly dull white on their exterior webs, forming a large patch on the wing. Bill and feet black. As compared with the Cape species, Spr. bicolor, (Gmelin; *Lamprotornis albiventris*, Swainson), the bill is less slender and Thrush-like, having more of the Lamprotornis form; and the tarsi are shorter: but we do not hesitate to refer it to the same genus. "Its Somáli name is *Hanagur*, اگر حين. The eye, like that of the Maina, is white; and it flies in large flocks."

*Buphaga erythrorhyncha, Stanley. *Hurio*, هريو. "This bird clings to Camels, and injures the wounded by picking out parasites and larvæ. Its eye is a light and brownish red. Habitat generally the plateau above the hills."

*Hyphantornis baglefecht? (Vieillot). This bird seems to agree sufficiently with Buffon's description of *le Baglefecht*.

Length about $6\frac{1}{2}$ in.; of wing $3\frac{1}{4}$ in.; and tail $1\frac{7}{8}$ in.: bill to forehead 16 in.; and tarse $\frac{3}{4}$ in. Crown and under parts bright golden-yellow, paling a little or passing to a purer yellow on the belly and lower tail-coverts, including the tibial plumes: back greenish-yellow with dusky mesial streaks; upper tail-coverts and tail yellowish olive-green, the rump somewhat yellower: wings dusky, the small coverts margined with greenish-yellow, the greater coverts and tertiaries with pale yellowish-brown, and the primaries with dull yellow: lores, ear-coverts, chin and throat, black, passing backward as a straight line from the nostrils, so as just to include the eyes. Bill infuscated, probably changing colour according to season; and feet brownish-carneous. "This bird flies in large flocks, and is fond of flowers, blossoms, and grass-seeds; avoiding jungle and trees."

*Passer castanopterus, nobis, *n. s.* Length about 5 in.; of wing $2\frac{3}{4}$ in.; and tail 2 in. Structure typical. Crown and occiput, scapularies and wing-coverts, vivid light chesnut: back, rump, and upper tail-coverts, greenish olive-grey, the first black-centred: cheeks and lower-parts clear pale yellowish, sullied with olive on the flanks: the usual black gular mark, extending down upon the breast; and the lores and feathers at the base of the lower mandible also black: a trace of a white wing-band; and the great alars and caudals dusky, more or less pale-edged, the margin broadest and more rufescent on the tertiaries. Bill and legs as in P. domesticus. "This species of Sparrow affects the jungles."

*P. (?) tristriatus; *Serinus tristriatus*, Rüppell. Bill typically formed; the white gular mark as in P. gularis, Lesson (*P. simplex* apud Swainson), of W. Africa: feet and claws more slender and delicate than in other Sparrows; and the plumage soft and lax. "Inhabits the mountains, and flies in flocks.

"The common English Sparrow does not exist in the part of the Somáli country visited by Lt. Speke: and it is generally asserted that it cannot live in Aden. The experiment of transporting them was tried by an officer, who brought from Bombay a batch of Sparrows and Crows. The former soon died; and the latter lingered through an unhappy life, became mangey, and (to judge from the absence of young) ceased to increase and multiply."

*Pyrrhulauda leucotis, (Stanley). "Found only at the village

of 'Goree Bunder:' the female has no black upon the breast, and somewhat resembles our Hedge-sparrow (ACCENTOR MODULARIS) in colour, only that she is a lighter."

*LANIARIUS CRUENTUS, (Ehrenberg). "By no means a common bird. The Somális call it *Idatris*, ادتريس."

PLATYSTEIRA SENEGALENSIS, (L.).

SAXICOLA ISABELLINA, Rüppell, *Atlas*, pl. 34, f. b.: according with the figure cited, except in having a greater extent of black tipping the tail-feathers, viz. $1\frac{1}{8}$ in. on the outermost: but apparently distinct from the species sent by Dr. Rüppell himself as his S. ISABELLINA (p. 260, *ante*), however closely affined. In the latter the short first primary measures 1 in.; in the Somáli bird $\frac{3}{4}$ in. only, being also considerably narrower. In Dr. Rüppell's bird, the crown is fuscous, and the upper parts are much infuscated; the lower dull ferruginous with white throat, and the lower tail-coverts deeply tinged with ferruginous: lores black, surmounted by white, which is continued into a slight supercilium; and the outermost tail-feather is black for its terminal $1\frac{1}{4}$ in.: tertiaries broad, measuring about $\frac{5}{8}$ in. across; and the bill somewhat broader than in the other, especially at base. The Somáli bird is pale sandy-isabelline above, still lighter below and without a tinge of ferruginous; and the tertiaries are about $\frac{1}{2}$ in. in breadth: both have the upper tail-coverts white; and they agree in dimensions. "Inhabits the plateau."

*S. MELANURA, Temminck. "Inhabits the plateau, and loves small trees." There is a figure of this bird, from a specimen obtained in Sindh, among the drawings of Sir A. Burnes and Dr. Lord.

*DICRURUS LUGUBRIS, Ehrenberg. "This 'King-crow' follows the flocks, perching upon animals, and balancing itself upon the waving plants. Irides red."

NECTARINIA HABESSINICA, Ehrenberg. "A Honey-bird, lighting upon flowers, and avoiding jungle."

*N. ALBIVENTRIS, Strickland, Jardine's *Contr. Orn.* Male and female. "Seen in pairs; and like the last inhabits the plateau above the hills." This species has only been obtained in the Somáli country.

PTEROCLES SENEGALENSIS, (Latham): *Pt. guttatus*, Lichtenstein.

Male and female. "This has all the habits of the corresponding Indian bird" (Pt. exustus, which is likewise African), "and is found on the plateau, where huge flocks abound. It is called *Fuku*, فقو"

*Pt. Lichtensteini, Temminck. Lt. Burton mistakes this for the Indian 'Painted Rock Pigeon' or 'Painted Grouse' of sportsmen (Pt. fasciatus); to which it is generally affined, but readily distinguishable upon comparison, being a considerably larger bird, &c. He remarks, that "it is the *Katá*, كتا, of Arabia, and is here called by the same name as the last, *Fuku*. It flies in flocks, and goes to great distances every evening to find water. If disturbed at the well, it flutters about with piercing cries. In Arabic poetry, it is used as a simile to express great swiftness."

*Pternestes rubricollis, (Latham). Male and female. "Common in the Somáli country. The natives call it *Dignin*, دگنن; the Arabs *Dijajat el bar*, دجاجت البر, or 'wild hen'; and the Persians (I believe) *Kabk*, کبک. It represents the domestic fowl in E. Africa; and its flight and run resemble those of the Guinea-fowl. It is a strong bird, requiring heavy shot, and has a game flavour. The Somáli have a prejudice against eating these, as well as other birds."

*Scleroptera gutturalis, (Rüppell). "Found on the top of the mountains, and not observed on the plateau or on the maritime plain." This is one of the African Partridges classed in Francolinus by Dr. Rüppell, Dr. A. Smith, and others; but which do not range well with the Asiatic Fr. vulgaris, Fr. pictus, Fr. chinensis (Osbeck, v. *perlatus*, Gmelin, of China, whence introduced into the Mauritius, and there known as the 'Pintado Partridge'), and Fr. Phayrei (of Pegu). They form a particular group, which is peculiar to Africa.

"Lt. Speke saw, but did not procure, a species of Corn Quail. I also observed many small Quails in the northern Somáli country, In the Gudabuzi country I observed the usual Dove of these climates, a fine large blue Pigeon like the 'Blue Rock' of India. The natives called it *Elal Jag*, ايللجگ, or the 'haunter of wells.'"

*Sypheotides humilis, nobis, *n. s.* "A Floriken with bright yellow iris, called by the Somális *Waradada*, وراد اد. Its cry is a

loud *Ka-ke-rák.* It is found in the plateau among heather" (low herbage), "and is not so shy as the Indian bird" (meaning probably the *Likh* of Bengal or 'Floriken' of S. India, S. AURITA). "Its pair [the male ♁] is smaller, and the feathers below the lower mandible are black."

A small and undoubtedly new species, remarkable for its very short tarsi. Plumage similar to that of a pale female S. BENGALENSIS; but the neck tinged with ashy, and the crown more fully crested: wings white underneath, but the long axillary feathers black; primaries dusky-brown, not banded; the secondaries blacker; and a large white spot formed by the basal $\frac{2}{3}$ of the coverts of the primaries: throat speckled with black. Length of wing $9\frac{1}{2}$ in.; of tail 5 in.; bill $1\frac{1}{5}$ in.; and tarse $2\frac{1}{2}$ in. only. A female specimen, to all appearance.

"Lt. Speke also observed a large species of Bustard" (probably EUPODOTIS ARABS). "Ostriches are found all over the Somáli country: they are very shy, and at about 3 P. M. disappear to hide themselves for the night. The natives say that the Ostrich is blind at night, and that they can then easily be killed."

*ŒDICNEMUS AFFINIS, Rüppell. Well distinguished from O. CREPITANS. "Called *Hedinhitu*, هدنهيتو, a name also given to a smaller Plover. It is half blind during the day, and may almost be ridden down, as it rises under the horse's hoofs with a loud cry. The eye is a light yellow. Its habits correspond with those of the Indian bird" (Œ. CREPITANS). It is found in all the upper regions of the Somáli country.

*CHENALOPEX ÆGYPTIACUS, (L.) "Called *Etal-Jaz*, التلجگ, 'who lives at wells.' It was found on the plateau at a brackish spring, and never observed on the coast."

*PHALACROCORAX LUGUBRIS, Rüppell *(Carbo melanogaster*, CUV., *Par. Mus.)* "A common *palmipede*, shot on the sea-shore."

REPTILIA.

The reptiles consist of two Lizards and a Snake, neither of the former full grown.

*AGAMA RUDERATA, Olivier *(A. mutabilis*, Merrem, &c.) A small specimen apparently of this or a closely affined species, with tail

not much longer than the head and body, exceedingly compressed throughout, and somewhat serrated above and below.

*Tiliqua Burtoni, nobis, *n. s.* Small and young individual, 5¼ in. long, of which tail 3¼ in. Very like T. rufescens of India; but the auditory orifice conspicuously smaller, and a series of broad scales along the upper surface of the tail: occipital group of plates also differently formed. Colour dark, with the two pale streaks upon the head and body strongly contrasting; and the throat freckled with dusky.

*Psammophis sibilans, (L.); *C. moniliger*, Lacepede. Var.? Apparently one of the many varieties of this common African Sand-snake, of a plain pale sandy-brown colour, somewhat more ruddy on the sides, and paler below; a dark brown streak passing through the eye, but no stripe on the body; the labials and sides of the abdominal plates obscurely and minutely freckled with buff-colour on a whitish ground. When the body is bent, the dark skin between the scales shews at the tip of each (on the convex side of the bend), imparting a speckled appearance: 17 rows of scales; scutæ 172; scutellæ 90 pairs. This Snake, according to Lt. Burton, is "called *Mas*, مس, in Arabic *Hansh*, حنش. It infests the lower hills (this specimen was found upon the plateau), and is much feared by the natives when travelling at night. It is said to be very venomous. There are many other varieties." It is not venomous.

PISCES.

*Tetrodon diadematus, Rüppell. This is the only fish sent. And of

ANNULOSA.

A Scorpion and three species of *Coleoptera*.

Notes on the Languages spoken by the Mi-Shmis, by W. Robinson, *Esq.* (*Communicated by the Government of Bengal*).

The mountain tribes, known to the inhabitants of Assam under the general appellation of Mi-Shmis, occupy those ranges at the north-eastern extremity of the valley, that stretch in the form of a crescent from where the Di-bong debouches into the plains, on the West, to the mountains inhabited by the Singpho tribes, on the East.

Whatever may be the origin of the term *Mi-shmi*, as applied to these mountaineers, it is not recognized by themselves, except in their intercourse with the people of the plains.

Like most other mountain tribes they are divided into a vast number of petty clans, each of which has a nominal head, but these seem so intimately connected with each other, that it is difficult to ascertain in what consists the difference that separates one clan from another. Their lingual peculiarities, however, separate them into three distinct divisions, and, adopting the name of the three great tribes among whom these differences of language prevail, we may class them as the Nedu Mishmis, the Taying or Me-me Mi-Shmis, and the Mijhu Mi-Shmis.

The Nedu or, as the Assamese generally designate them, the *Chuli-Kotá* Mi-Shmis, from the circumstance of their wearing their hair short, are the most western of the Mi-Shmi tribes. They occupy the mountains on both banks of the Di-bong, and speak a language peculiar to themselves, yet bearing some affinity to that spoken by their neighbours the Abors and Miris.

The Taying (Taen) or Me-me Mi-Shmis, extend eastward from them to the right bank of the Lohit—the Brahmaputra, while those tribes on the left bank of the great river, are known as the Mi-jhu or Mai-jhu Mi-Shmis. These latter possess many vocables in common with the Singphos, showing the existence of an affinity in the two languages that might have been expected from the geograghical position of the tribes speaking them.

At the close of the year 1844, Capt. E. A. Rowlatt, undertook a tour into the Mi-Shmi hills, and his Report of the Expedition was

published in the XIV. Volume of the Asiatic Society's Journal, (see p. 477). I fear I can add nothing of importance to the valuable information he then communicated regarding the manners and customs of this people. I shall, therefore, confine myself on this occasion to a few notes on the grammatical peculiarities of two of the Mi-Shmi dialects, the Taying and Mi-jhu, the only two I have yet had an opportunity of investigating.

The Language of the Taying and Me-Me Mi-Shmis.

Of Nouns.

Nouns admit of no variations expressive of *number;* the plural state is generally defined by a numeral, or some other word expressive of quantity. Thus; Nkoe, a *dog*, Nkoe Ka-prei, *four dogs*, Nkoe-Su-Newe, *many dogs.*

Nor are the accidents of *case*, distinguished by any inflections or differences of termination. The genitive case is denoted merely by the juxta-position of the two substantives; the former being understood to be in the genitive case, e. g.

Tamium lami, *the monkey's tail.*

Machom hari, *the root of the tree.*

Maji ru, *the buffalo's horn.*

The accusative is the same as the nominative, and is distinguished only by its position in the sentence.

Ha teku bri no, *I want to buy paddy.*

A ro lum ma-bie, *the boy will not catch the goats.*

The other relations of nouns are marked by the use of post-positive particles.

Gender, in individuals of the human family, is marked by the use of distinct terms. For example:

Mawa, *man*—mia, woman.

Naba, *father*—nama, *mother.*

Ayewa, *son*—ayia, *daughter.*

Pamyo, *younger brother*—mathie, *younger sister.*

In the case of the inferior animals, the appellatives karü, *male*, and tassi, *female*, are added to the noun. E. g. Majari karü, *a male cat*—majari tassi, *a female cat.*

Nkoe karü, *a dog*—nkoe tassi, *a bitch.*

Machu karü, *a bull*—(bos) machio tassi, *a cow.*

The only exception to the general rule is in the case of the domestic fowl—inteo.

Inteo tala, *a cock*—inteo tassi, *a hen.*

Of Adjectives.

Adjectives do not alter their terminations to express either number, case or gender. The position of an adjective in a sentence is invariably after the noun it serves to qualify.

Nye-chi che-bwa, *sweet milk.*

Machi ji-eh, *a broad river.*

Phaji a hungya, *a ripe plantain.*

As the language rejects terminations of every kind, it of course has none to make the degrees of comparison. The deficiency is in some measure supplied by shortening or prolonging the adjective in articulation. For example ; ká-jem katyoa, *a short cloth.* When it is intended to convey the idea of *a very short cloth*, the qualifying word katyoa is uttered with a short and abrupt sound.

Alyim kálong, *a long road.* By lengthening out the sound of the adjective, kálong, the idea conveyed would be that of *a very long road.*

The mode of *numeration* that obtains among the Taying and Me-me Mi-Shmis, presents us with a few interesting peculiarities. The system is emphatically a decimal one.

1. E-Khing.	11. Halong Khing.
2. Ka-ying.	12. Halo-kaying or Halo-raying.
3. Ka-chong.	13. Halo-rachong.
4. Ka-prei.	14. Halo-raprei.
5. M-angu.	15. Halong manga.
6. Tharo.	16. Halong tharo.
7. Uwe.	17. Halong uwe.
8. Elyem.	18. Halong elyem.
9. Konyong.	19. Halong konyong.
10. Halong.	20. Halong-halong, vel Kaying halong.

30. Kachong halong, the unit following the decade in regular order.

40. Kaprei halong.
50. Manga halong, &c. &c.
100. Malum, 1000 Re-jong.

There are no ordinals in the language.

Of Pronouns.

There is no distinction of gender in the pronouns of this language. In the case of the 1st and 2nd person, the sex is supposed to be known, and in the 3rd person it must be inferred by a reference to its antecedent.

The Personal Pronouns are—

Singular.	*Plural.*
1st Há. *I.*	Hing long. *We.*
2nd Nyó. *Thou.*	Nyó long. *Ye.*
3rd Mtá. *He or she.*	Mta long. *They.*

The relations of *cases* are denoted in the same manner, as already exemplified with reference to nouns substantive.

The Demonstrative Pronouns are Esá the proximate, and Hisá, the remote. These are reduplicated to denote the plural.

Esá-esá *these*, and Hisá-hisá *those.*

The Interrogative Pronouns are Sáhá, *who?* Esá-há, *which?* and ságehá, *what?*

Relative Pronouns are very vague, so much so indeed, that I am unable to speak with precision of the existence of any, sentences being in general so rendered as to obviate the necessity of them. Thus, instead of the phrase, "*the man who died,*" a Taying would say, Nme siyoge-á, *the man he died or the dead man.* So also the phrase Tou-chi bri á—"*the oil it was purchased*, would be used for, *the oil which was purchased.*"

Of Verbs.

The various kinds of verbs in this language must be denominated wholly from their meaning and signification, as active, passive, neuter, causal, &c.

The relations of time are expressed by affixes, except in the *present tense*, which may be taken as the root of the verb; and only three Tenses can be traced in the language, viz. the Present, the

Past and the Future. Verbs undergo no modification consequent on number or person.

Indicative Mood.

Present Tense.

Há átyá, *I speak;* Nyo átyá, *Thou speakest;* Mta átyá, *He speaks;* so also, Há de, *I sit;* Nyo dwe, *Thou standest;* Mta chu, *He runs.*

The *Past Tense* is formed by the addition of á; Há átyá-á, *I did speak;* Há de-á, *I did sit;* Nyo dwe-á, *Thou didst stand;* Mta chu-á, *He did run.*

The *Future Tense* is formed by adding Ande or Ende to the root of the verb. Há aty-ande, *I shall speak;* Nyo de-ande, *Thou wilt sit;* Mtá chu-ende or chuyende. *He will run.*

Gerund.

The language has no affix to mark the Gerund or to indicate the Infinitive Mood; the position of the verbs in a sentence being considered sufficient to indicate their meaning.

1 2 3 4 1 4 3 2
Mta teku bu no, *He wants to buy rice.*

1 2 3 4 1 4 2 3
Mta machom teo te, *He cuts down the tree to sell it.*

In some few instances, however, the particle ge, is used after the verb, apparently as the sign of the Gerund.

1 2 3 4 5
E. g. Mia,a esa huv-ge tase-ge bonde,

2 1 5 3 4
These girls will go to dance and to sing.

The Imperative Mood

is formed by the addition of the particle a, or na, to the verbal root. As in commanding, it is obvious, it is only the second person that is addressed, this mood may be said to exist only in that person.

Nyo bona, *Go thou!* Be-an-a, *Be silent!*

Nyo tap-pa dwe-na, *Lift up your spear!*

Prohibition

is implied by the addition of gá to the root.

Oku-ga, *Do not steal;* Se-ga, *Do not kill.*

Nyo na-pho khomiode-ga, *Do not be angry with your brother.*

Simple Negation

is commonly expressed by the word yem, or yom, appended to the root of the verb. Mta mara yom, *He does not laugh.* Mta, nyo abba no-yem, *He does not wish to strike you.*

But in the future tense, negation is implied by the word Lum. Ha-che-lum, *I shall not take it.* So lung ma-chu nye-chi hong-lum, *To-morrow the cow will give no milk.*

Potential Mood.

When power or capacity is to be expressed, the word Hanende is added to the root of the verb.

Atya han-ende, *I can speak.*

Mta bo han-ende, *He can go.*

In the *Negative* form, Hane lum is substituted.

Atya hane lum, *I cannot speak.*

Mta Khre muba hane lum, *He cannot work, or has not the power to work.*

Particles.

Adverbs sometimes precede and sometimes follow the verbs they serve to qualify. Chy amte, *Quickly;* Chy amte chuna, *Run quickly;* Beh-e, *slowly;* Beh-e chia, *Walk slowly;* Beh-mte, *Quietly;* Beh-mte chona, *Put it down quietly;* Cha lung, *To-day;* Beling, *Yesterday;* So-hing, *To-morrow;* Mja Kanong? *Why?* Hno? *Where?* Kadego? *When?* Omam, *Yes;* Sam, *No.*

The *Prepositions* of occidental languages are, in this, rendered by post positive particles. For example:

Kwa *in:* máye pya an kwá á,
1 2 3 4

The eggs are in the nest.
1 4 3 2

Do *with:* mta togo do nokwe chende,
1 2 4 5

He will kill the dog with the da.
1 5 4 3 2

Tomno *with:* Nya tomno sa naha?
1 2 3 4

Who has come with you?
3 4 2 1

Tappe *from:* Kreko tap pe ke ku chenema,
1 2 3 4

4 3 2 1
Bring the riee from the basket.
1 2 3 4
E tappe machi Kade-gadyá,
4 3 2 1
How far is the river from this?

In ordinary conversation these particles are frequently omitted, where the sense can be ascertained without them.

1 2 3 3 2 1
Haban ta mya *á? Is there a tiger in the jungle?*

Eya, Ridega, *There is. Fear not.*

Tamya elapi ha onde, *If there is a tiger I shall shoot him.*

Nyo mpo tawan thui aha? *Are your arrows poisoned?* or literally, *Have you any poison in your quiver of arrows?*

The Language of the Mi jhu Mi-shmis.

Of Nouns.

Gender.—This language possesses a variety of substantive terms, sufficient to denote all that is needful in the distinction of sex among human beings. Thus:

Ktchong, *Man;* Kmai, *Woman.*

Kepai, *Father;* Mum, *Mother.*

Sha, *Son;* Kmai sha, *Daughter.*

Tchep-mai, *Brother;* Ke-tchep mai, *Sister.*

Kesa, *Boy;* Mai-sa, *Girl.*

In the case of the inferior animals, the difference of gender is denoted by the terms Nga-long, *male,* and Kmai, *female,* appended to the noun Egj.

	Masculine.	*Feminine.*
Manyong, *an elephant;*	Manyong nga long,	Manyong Kmai.
Toppu, *a tiger;*	Toppu nga long,	Toppu Kmai.
Kampai, *a goat;*	Kampai nga long,	Kampai Kmai.
Leh, *a hog;*	Leh nga long,	Leh Kmai.

The only exception to this rule occurs, as we have noticed also in the language of the Taying Mishmis, in the case of the domestic fowl Kai. *Male,* Kai apai. *Female,* Kai Kmai.

Number.—The noun admits of no plural form, in those instances in which the noun does not express a collective or a plural idea, a numeral added to it renders the expression sufficiently intelligible.

Ngang, *a goose;* Ngang ngun, *eight geese.*

Klan, *a flower;* Klan Kaplak, *all the flowers.*

Case.—There are no inflections in the language used for representing the various relations of nouns usually termed cases.

The expression of the Genitive case depends only on the juxtaposition of the two substantives, of which the former is understood to be in the Genitive.

Wa lap, *The leaf of the bamboo.*

Sabu yop, *The child's hand.*

The other cases are marked by the use of post positive particles.

Of Adjectives.

An adjective generally follows a substantive; as Manchu Ka-im, *a black cow;* K ang ga K hrang, *a long horn.*

There are no terminations to mark the degrees of comparison. But as the comparison of one person or thing with another so as to ascertain the relative quality possessed by each, must necessarily exist in some form in every language, we find that the general mode of forming comparisons in this, is merely by placing the adjective after the noun with which the comparison is made; Ke an Ktchong Kashyung, *I am leaner than this man;* or literally, *I this man lean.*

1 2 3 4 1 4 3 2
We no umong Kam, *He has more (than) you.*

Kadun, *much* or *very* is often added to an adjective to express a quality as existing in the highest degree.

Si Kamcheng Kadun, *The water is very cold.*

Numerals.

The following is the cardinal series of numerals adopted by the Mi jhu Mishmis.

1. Kmo.	6. Katham.
2. Kaning.	7. Nun.
3. Kacham.	8. Ngun.
4. Kambum.	9. Nyet.
5. Kalci.	10. Kyep.

Kyep ma Kmo, 10 and 1.

Kyep ma Kaning, 10 and 2.

Kyep ma Kacham, 10 and 3, &c.

20.	Ketag.	30.	Sung gyep.
40.	Brisi.	50.	Ngrunsi.
100.	Waye.	1000.	Kannu.

There are no ordinals in the language.

Of Pronouns.

Gender has no place in the personal pronouns of this language, nor do they undergo any variations indicative of *Case*. As far as they are used as substantives, they admit of the addition of post-positive particles as in the case of nouns. As pronouns in ordinary discourse are frequently introduced without that connexion which could enable the hearer instantaneously to decide, whether one or many were intended, a mode has here been adopted to determine this independently of the connexion, and in consequence, the people make use of the termination Thal to express the plural number.

The personal pronouns are—

Singular.	*Plural.*
1st. Ke, *I.*	Kethal, *We.*
2nd. No, *Thou.*	Nothal or Nonethal, *Ye.*
3rd. We, *He or she.*	We thal or Vethal, *They.*

The demonstrative pronouns are, An, *This* and Phehai, *That.*

The interrogative pronouns are, Hoina, *Who?* Asan manai, *Which?* and Sindoi, *What?*

I am not aware of the existence of any relative pronouns in the language. This deficiency is supplied in the same manner as in the language spoken by the Taying Mishmis.

Of Verbs.

The moods and tenses of verbs are expressed by means of particles or significant words appended to the verbal root; but number and person are distinguished by no modifications.

Indicative Mood.

Present.

The verb in its simple state is often used as the form of the present tense, e. g.

Ke ndat, *I call;* No gap, *Thou fightest;* We gya, *He runs.*

To express a more definite signification, the word Meng is added as an auxiliary; thus,

Ke ndat meng, *I am calling;* No gya meng, *Thou art running;* We gap meng, *He is fighting.*

Past time is denoted by the addition of the particles Ga for the Imperfect, and Kong for the Perfect Tense.

Ke ndat ga, *I did call;* Ke gap ga, *I did fight;* Ke gya ga, *I did run.*

We ndat Kong, *He has called;* Gap kong, *Has fought;* Gya kong, *Has run.*

Future. Iung added to the verb denotes future time.

Ke ndat iung, *I shall call;* We gap iung, *He will fight;* No gya iung, *Thou wilt run.*

There is no particular form to mark the Gerund, but in all ordinary cases, it is the verb in its simple state followed by another verb. Thus; Vethal tamy in vitch sup-kong, *They have purchased the salt to sell it,* or *for the purpose of selling it.*

The Imperative Mood

which exists only in the 2nd person is indicated by the addition of Chu to the verbal root.

Khai chu, *Speak!* Groin chu, *Lift it up!*

Kesa maisa kaplak mai jai thai-chu,
1 2 3 4 5 6
3 1 2 6 4 5
All you boys and girls go and dance and sing.

Prohibition is expressed by prefixing Aí to the root; thus, Aí khai, *Do not speak;* Aí ngái, *Do not weep;* Aí mui, *Do not sleep.*

Simple Negation is expressed by prefixing Má to the root. Thus; We má lap, *He does not sit;* Kwe má chak iung, *The dog will not bite.*

Potential Mood.

Power or capacity is usually expressed by Non-niu added to the verb. We rung brü non-niu, *He can break the boat;* No jai non-niu, *You can sing.*

In the *Negative* form Má is prefixed. Ke mai má non-niu, *I cannot dance.*

Particles.

When a question is asked, the interrogative particle I is commonly used, except when any other word in the sentence implies an interrogation.

Wa jai-meng, tyat ma i? *The birds are singing, do you not hear them?*

No chi swí i? *Are you afraid of a mouse?* An na bang? *Whose cloth (is) this?* Ke gang na la kong? *Who has taken my bow?*

Adverbs generally precede the verbs they serve to qualify.

To nit, *To-day;* Mangane, *Yesterday;* Terung, *To-morrow.* Na-chang, *Slowly;* Ukai *Quickly;* Layim, *Yes.* Mka, *No;* Yahetai, *Where?* Chendo, Siga, *Why?*

The particles that take the place of Prepositions in this language usually follow the nouns they govern.

Sentences.

An thong ho, *Come and see this.*

Chohun miro sal chu, *Bring Chohun with (you).*

An tang klau na phi-kong? *Who has given you this spear?*

Heram vitch-kong, *Heram sold it.*

Mangane techim kmo chat-ga, *Yesterday I killed a wild hog.*

Ti kong ti thong-chu, *Feteh some water from the water ghaut.*

Bli la ho i? *Will you come into the house?*

Nkhar li ktchong ma chak, yahctái thai-kong,

There are no men in the village, where have they gone?

Kom chat thai-kong, *They have gone to kill a bear.*

Tonit an nga Tam thongga, *Tam brought this fish to-day.*

VOCABULARY.

English.	*Ta-ying Mishmi.*	*Mijhu Mishmi.*
Air	Hzung	Mbaong.
All	Su-mive	Ka-plak.
Anger	Khomí	Sot-do.
Ant	Pa-swi	Cha kri.
Arrow	Mpo	Lo wát.
Ashes	Mgó	Da-moung.
Ask	Hahona	Wyet-chu.
Aunt, *Pat.*		
„ *Mat.*		

English.	*Ta-ying Mishmi.*	*Mijhu Mishmi.*
Back	Mpling	Glok.
Bad	Prám	Mphan.
Bag	Kaple*h*	Tapái.
Bamboo	Hweí	W*a*.
Basket	Ka-le	Hó.
Beads	Ari	Krón.
Bear (n.)	Tahum	Kom.
Beard	Thrung-mung	Ha-mou.
Beat	Ab-bana	Phong chu.
Bead	Ipo-áng	Má.
Bee	Ta bi-ye	Sing glak.
Beg	Tha chi na	Gajai ja mong.
Belly	Klita pum	Ndak.
Betlenut	Gowe	Tarsi-chyet.
Bird	Mpía	Wá.
Bite	Thug-na	Chak-Chu.
Bitter	Ká	Hám.
Black	Ma-kwa	Ká im.
Blood	Rhwei	Vi.
Boat	Ro-wang	Rung.
Body	Mtho	Chai.
Bone	Lu bung Lubra	Zak.
Bow (n.)	Arri Kan	Gang.
Brass	Kha chi	Ta-nai.
Break	Hjo-na	Bru-chu.
Broad	Ii e*h*	Pat-ge-thai.
Brother *(elder)*	Na-fo	Tchepmai.
Brother *(younger)*	Pamyo	Gotwoi.
Buffaloe	Ma-ji	Tal-loi.
Burn	Pwe-na	Ru-nga-chu.
Bury	Mung-chona	Kam-tha-chu.
Call	Ame-na	Ndat-chu.
Cat	Majari	Jámi.
Catch	Ro-na	Choung-chu
Check	Tyiopo	Mlrup.
Child	Agemung	Sa-bú.

English.	*Ta-ying Mishmi.*	*Mijhu Mishmi.*
Chin	Thano	Maha.
Cloth	Ka-jem	Bang.
Cloud	Anying	Ne-ou.
Cold	The-a	Kan-cheng.
Come	Honna-na	Hoi-chu.
Cook (v.)	Hi-a-na	Tchyot-chu.
Copper	Proi	Khyok.
Cow	Ma-chu	Man-chu.
Crooked	Gawe-ya	Kai-ku-kaiko.
Crow (n.)	Chak-lá	Wa-ha.
Cry	Khro-na	Ngai-chu.
Cut	Te-na	Njang chu.
Dance	Bui-na	Mai-chu.
Darkness	Kano	Báng-lá.
Daughter	Ayia	Kmai-Shá.
Day	Ki-hing	Songla.
Deaf	Nkru-na-Káppá	Ing-kom-bong.
Deep	Rum-ma	Gatháng.
Die	Siyoge	Ka-si-le.
Dig	Thuna	Leh-chu.
Dog	Nkoe-Nokwe	Kwe.
Drink	Chumma	Thang-chu.
Dry (adj.)	Soi-ya	Ge-sar.
Duck	Tkhréng-bu	Kai-pet.
Ear	Nkru-ná	Ing.
Earth	Thli	Nyai.
East	Te-thi-yang	Lóng.
Egg	Máye	Chet.
Elbow	La-Ku	Rok-slong.
Elephant	Amieng	Mányong.
Eye	Mollom	Mi*h*.
Face	Mi-nya	Ringa.
Fall	Ga-lya-na	Du-chu.
Far	Dyáu	Klam.
Fat	Dong-ya	Ka-shyot.
Father	Na-bá	Ke-pai.

English.	*Ta-ying Mishmi.*	*Mijhu Mishmi.*
Fear (v.)	Ri-de-na	Sui-mang.
Feathers	Mung	Bú.
Fight	Toe-na	Gap-chu.
Finger	A-twi	Yop-dom.
Fire	Na-ming	Mai.
Fish	Tan	Nga.
Flower	Tappul	Klau.
Foot	Mgrung	Mplá.
Forest	Ha-bo-an	Kanan.
Forget	Wemsaya	Lamatko.
Frog	Ta-pwa	Nkhang.
Fruit	Chi	Chep.
Get	Tingyá	Than-chu.
Girl	Miá-á	Mai-sa.
Give	Hong-na	Phi-chu.
Go	Bona	Phai-chu.
God	Nging-ya (?)	Se-lap.
Goat	Ma-bie	Kam-pai.
Gold	Paddei	Som.
Good	Pra	Ga-chit.
Goose	Tkhrong-chi	Ngáng.
Grass	Ta-re	Roh.
Great	Drung	Ka-tái.
Hair	Thong	Chám.
Hand	Htyoa	Yop.
Hard	Tal-li-ya	Kong-mang.
Hate	Ka-pú-de-na	Ga-chok-chu.
Have	An	Kám.
He	Mta	We.
Head	Mkau	Kou
Hear	Pha-rong-na	Tyat-chu.
Hill	Thiá-Maia	Neng-tau.
Hog	Báli.	Leh *(domestic.)* Techim *(wild.)*
Horn	Ru	Kang.
Horse	Grue	Kom-beng.

English.	*Ta-ying Mishmi.*	*Mijhu Mishmi.*
Hot	Tia	Kyem.
House	Ong	Bli.
Husband	Ha-mawa	Ke-ro-wai.
I	Ha	Ke.
In	Kwa	Li-Lá.
Iron	Tsi	Teng-gri.
Ivory	Ta-meng-lang	Men-yong-chí.
Kill	Se-kwon-de	Chat-mi-chu
Kiss (v.)	Do-ná	Yup-chu.
Knife	Nhwa	Soit.
Knee	Fa-bung	Pat-pau
Know	Kasai-a	Kong-nyet.
Laugh	Mara-a	Krep-chu.
Little	Go-chwá	Metham.
Light (n.)	Soná	Songla.
Lightning	Ablû	Mphrạ.
Look	Katho-na	Thong-cha.
Long	Kalong	Gakhrang.
Mad	Kappạ	Karua.
Man	Nme	Ktchong.
Many	Ndü	Kadnu.
Mat	Tahrü	Sin.
Medicine	Ta-ma	Ta-si.
Milk	Nye-chi	Chynn.
Monkey	Tamium	Mu*h*.
Moon	Hlo	Lai.
Mother	Ná-mạ	Nu-nu.
Mouth	Ku-kwen	Njyut.
Name	A'mung	Lámong.
Near	Mgá*h*	A'liroh.
Neck	Pa-húng	Hóng.
Nest	Pya-au	Wa-sa.
New	Moye	Gotan.
Night	Ya-bo	Búnglá.
No!	Sam	Mka.
Noise	Tyakwo	Lót.

English.	*Ta-ying Mishmi.*	*Mijhu Mishmi.*
North	Ha-piye	Kampeyn.
Nose	Hnyá-gom	Min-yong.
Oil	Tou-chi	Na-man.
Old	Me	Gothung.
Open	Kana	Yat-chu.
Paddy	Ke	Hál.
Place (v.)	Cho-na	Tha-chu.
Plant (v.)	Lena	Lap-chu
Plough	Sipla	Thai
Pull	Mago-na	Gang-chu.
Push	Nyung Hlia-na	Lat-chu.
Quarrel	Khogaḥa-na	Maha-chu.
Quickly	Chyamte	Ukai.
Quietly	Beh-mte	Nachangui.
Rain	Kara	Ruwang.
Raise	Dwe-na	Gro-in-chu.
Rat	Ka-chi	Chi.
Ratan	Lakká	Lamaí.
Rice *(cooked)*	Tapoye	Set.
„ *uncooked*	Ke-kou	Ha-ku.
Ripe	A-hungyạ	Kasum.
Rise	Dwena-na	Long-chu.
River	Ma-chi	Ti-taem.
Road	Alyim	Blo-ong.
Run	Chu-na	Gya-chu.
Salt	Plą́	Ta-myin.
Sand	Tappi	Ka-chen.
See	Ka-tho-na	Thong-chu.
Seek	Mla-na	Hong-chu.
Sell	Tco-na	Vitch-chu.
Short	Ka-tyoạ	Ga-thi.
Shut	Ta-kwe-na	To-kwe-chu.
Silver	Pau-eng	Rupái.
Sing	Ta-se-na	Jai-chu.
Sister *(elder)*	Na-bi	
„ *younger*	Ma-thié	

English.	*Ta-ying Mishmi.*	*Mijhu Mishmi.*
Set	Dena	Lap-chu.
Skin	Kwa	Wong.
Sleep	I-na	Mui-chu.
Slowly	Beh-e	Nachang.
Small	Che-ka	Karusa
Smoke (n.)	Naming-khu	Mai-hut.
Snake	Ta-bu	Zhú.
Son	Á'ye-wa	Sha.
Soul	Ta-we	Hang Mchim.
Sour	Hru-wa	Churr.
South	Ha-chua	Kam-dong.
Speak	Atya-na	Khai-chu.
Stand	Dwe-na	Long-chu.
Star	Ká-ding	Maji.
Steal	Oku-na	Rohu-chu.
Stone	Mphlá	Laung.
Stop	Kalyo-na	Long-chu.
Strong	P-eú	Kam-blau.
Sun	Ring-Nging	Lemik.
Sword	Togo-Sambe	Sambe
Spear	Tappa	Tang-Klau.
Sky	Ning	Tep-chyok.
Take	Che-na	La-chu.
Thunder	Búrra	Tomok.
Tobacco	Dhuá	Yamum.
Tooth	Laṇ	Tsi.
Tree	Machom	Chang-to.
Village	Má-tyung	Nkha-yeng.
Uncle *(pat.)*	Nada	Ua-pong.
„ *mat.*	Na-ku	Ke-yup.
Want	No-a	To-en-chu.
War	Mre	Et.
Water	Má-chi	Ti.
West	Holla	Sam.
White	Leowa	Kam-phiong.
Wife	Hamya	Ke-kmai.

English.	*Ta-ying Mishmi.*	*Mijhu Mishmi.*
Wind (n.)	Hzung	Mbá-ong.
Woman	Miá	Kmái.
Wood	Barong	Sang.
Work (v.)	Khree-mu-ba-na	Se-nam-ha chu.
Year	Ka-nung	Laoma.
Yes	Omam	La-yim.
Young	Msa-bre	Yong-sa.

Notes on ancient Inscriptions from the Chusan Archipelago and the Hazara Country.—By Bábu Rájendralál Mittra, *Librarian, Asiatic Society.*

The accompanying plate (XV.) contains facsimiles of three inscriptions lately submitted to the Asiatic Society. The first two are from Putu in the Chusau Archipelago and are interesting as affording traces of Buddhism in the remote isles of the China Sea. Mr. Townsend Harris of the American Consulat at Ningpo, to whom I am indebted for an opportunity of examining facsimiles of these records, informs me that the island, whence they are brought, is covered with the remains of monasteries, temples and hermitages, and held in great veneration by the Chinese. As a place of pilgrimage its reputation was at one time sufficient to attract the presence of the Emperor Kanghi to its shores, aud even to this day, no females are allowed to land on it, lest they should defile it by their presence. The inscriptious were found recorded on granite tablets on the road side, about two hundred yards apart from each other.

The substance of the first inscription (Plate XV. No. 1) is the well known Buddhist formulary "Om Manipadmé hum," written in Sanskrita and Chinese characters. The second (No. 2) iucludes the same formula along with two other invocations, with the heading "*tryam*" triplet. The Sanskrita characters of both are of the 7th century of the Christian era, and bear a strong likeness to the modern Tibetan. There seems, however, to be a slight difference in the style aud cut of the letters which induces me to think the first inscription to be somewhat older than the second.

The words of the triplet are:

Om Aripachani hrih.

Om Manipadmé hum.
Om Vajrapáni* hriñh.

The first line is apparently the Vija-mantra or formula sacred to a Bodhisattva of the name of Aripachani, the second, according to Mr. Hodgson, is the Vija-mantra "of Padmapáni the *præsens divus* of the theistic school of the Buddhists," and the third of Vajrapáni, the third celestial Bodhisattva and lord ascendent of the last preceding age.

The most peculiar characters of the formulæ are the syllables ह्रीः *hrih*, हूं *hum*, and ह्रीं: *hriñh*, but of their meaning nothing satisfactory can be made out with the aid of the Sanskrita Dictionary or Grammar: they are evidently mystic emblems and perfectly independant of all lexicons.

Georgi in the Alphabetum Tibetanum, M. Klaproth in the Journal Asiatique, and Professor Mill and Mr. Hodgson in the pages of this Journal have discussed at great length the import of the first inscription, and the first three are of opinion that the particle *hum* is equivalent to the Sanskrita *tathástu* and the English Amen. This opinion is supported by the author of the *Mediní* who explains *hum* with the word *abhyanujná* "assent," or "permission," and there can be no question that that is the true meaning of the word when used in common composition; in connexion with vijamantras, however, we venture to think the meaning is different. The particle in the second inscription is in the same position with the words *hrih* and *hriñh* and appears to be almost convertible, and yet the latter have as yet found no place assigned to them in any Sanskrita dictionary. In the *Kriyá-sañgraha*, seventeen† different particles are used to convey

* The penultimate letter appears more like प्य pya or स्य sya than पा pá, and the name may possibly be Bajrasattva, but the last letter being distinctly a न *na*, I think the inscription has received some scratch under the letter in question, and that it is a पा.

† ॐ वज्रसत्त्व-हूं ॐ रत्नवज्र-त्रां ॐ धर्मवज्र-ह्रीः ॐ कर्म्मवज्र-अः ॐ वज्रराज-जः ॐ वज्रराग-हाः ॐ वज्रसाधु-सः ॐ वज्ररत्न- ॐ ॐ वज्रतेज-आः ॐ वज्रयज्ञ-हं ॐ वज्रहास-हां ॐ वज्रधर्म्म-ह्रं ॐ वज्रतीक्ष्ण-धं ॐ वज्रहेतु-मं ॐ वज्रभास-रं ॐ वज्रकर्म-कं ॐ वज्रसन्धि-वं।

the same idea in connexion with the name of Vajrapáni which *hum* does with reference to Padmapáni in the inscription before us. The word is sometimes used by itself, as in the *Durgati Sodhana Avadána*, where the repetition of the mystic *hum* four times is said to be a preventive of all evils.* But it is in the *Vijachintámaní* where we find the most conclusive proof of these terms being symbolic of some divinity, and in no way amenable to the rules of philological construction. The 4th section of that work states† that *h* is a representative of the sky, *m* of Síva, *u* of Sakti and the semilunate nasal mark *nádabindu* of the dispenser of salvation, and these letters together constitute the emblem *hum*. *Hriñh*, according to that authority, is emblematic of Síva, Vishnu, the presiding deity of the crown of the head, the Yoni, and the dispenser of Moksha.‡ *Ghain*, *Srim* and a host of other particles are explained in a similiar way.

Nor is this mode of typification opposed to the practice of the Hindus. The idea of using a literal symbol to designate the Deity's self, first originated with the Bráhmans, and the most ancient term of its kind is no doubt the Vedic Om. It is the great instrument of Bráhminic devotion, and may be assumed to be the archetype of all the symbolical terms used by the people of India whether Bráhminists or Buddhists. S'ákya Siñha early imported it into Buddhism and his followers have ever since used it to indicate the Supreme Adi Buddha or whoever may be the prime source of all intelligence.§ The Jains not only adopted it, but coined a new term *Em* to devote the female

* युक्तश्चतुर्भिर्ङ्कारैः प्रयुक्तः सर्व्वकर्म्मसु। कुलत्रयेषु सामान्यः क्रोधो ह्यमृतकुण्डली। सर्व्वविघ्नविनाशाय गुह्यकाधिप्रभाषितः। *Durgati Sodhana Avadána.* Asiatic Society's MS. No. 817, folio 15, p. 1, line 12.

† सर्व्वविघ्नहरं देवि हकारं व्योमसञ्ज्ञकम्। सर्व्वपापहरं देवि मकारं शिवरूपकम्। उकारं परमेशानि शक्तिरूपा सनातनी। महामोक्षप्रदं देवि नादविन्दुं सुदुर्ल्लभम॥ ह्रूं॥ Vija-chintámani, 4th patala.

O Devi the letter ह (h) called Vyoma or the sky, destroys all evils, and the letter म (m), which is a manifestation of Siva, purifies all sins; the ऊ (ú) is the embodiment of *Sakti* called *Sanátaní*, and the ँ (cerebral nasal mark), O Devi, is the dispenser of Moksha.

‡ शिवरूपं हकारञ्च रेफो विष्णुर्न संशयः। ईकारं मूर्द्धिनो साक्षात् योनिपीठः सुरेश्वरि। नादविन्दुं महेशानि साक्षान्मोक्षप्रदायकम्। ह्रीं। *Ibid.*

§ Memoires concernant l'Histoire, &c. des Chinois, V. p. 59.

energy or efficient cause of the Universe, Om being, according to them, a representative of the Omniscient as quiescent and unconnected with the world.

Among Buddhists, following the well known law of phonology whence arises the cockneyism of aspirating initial vowels, Om, we imagine, readily passed into *Hum*, and when the seed for multiplying mystic symbols was once thus thrown on a soil so pre-eminently favourable to the development of fancy as is supplied by the Indian mind, not only did the original emblem of the Deity undergo the most phantastic transformations, but the whole of the Sanskrita alphabet* was put into requisition to supply materials for esoteric symbols of divinity. The Bráhman followed in the wake of the Buddhist, and no ordinary care was taken to assign these new terms to appropriate deities and invest them with the most extraordinary attributes. The greater portion of the *Gyut* or the last division of the *Kahgyur* is devoted to this object, and the Tantras of the Bráhmans are replete with the most varied forms of Mantras. In some instances these symbols are extended to most unwieldy proportions. The Vijamantra of Syámá, a form of Durga, according to the *Mahánirván Tantra*, is "Kriñ kriñ kriñ húm húm hriñ hriñ Dakshine Kálíke kriñ kriñ kriñ huñ huñ hriñ hriñ swahá" [क्रौँ क्रौँ क्रौँ ह्रं ह्रं ह्रीँ ह्रीँ ह्रीँ दक्षिणे कालिके क्रीं क्रीं क्रीं ह्रँ ह्रँ ह्रीँ ह्रीँ स्वाहा]; that of Bhadra Káli is, "Haum Kali, Mahákali, kili kili phat swáhá" [ह्रौं कालि महाकालि किलिकिलि फट् स्वाहा]; that of Kátyáyaní "Aim hrim srim chaum chandikáyai namah," [ऐं ह्रीं श्रीं चौं चण्डिकायै नमः]; that of Narahari "Ám hrim khaum hum phat" [ऋां ह्रीं खौं ह्रं फट्] that of Tvaritá, "Om hrim hum khe cha chhé kha stri hum kshe hrim phat" [ॐ ह्रीँ ह्रं खे च छे च स्त्रीं ह्रम् क्षे ह्रीम् फट्].

* अकारादिक्षकारान्ता मातृका बीजरूपिणी।
विसर्गश्चैव विन्दुश्च त्रिविन्दुर्ब्रह्मविग्रहः॥
वर्णात्तु जायते ब्रह्मा तथा विष्णुः प्रजायते।
रुद्रश्च जायते देवि जगत्संहारकारकः॥

The letters अ to क्ष of the alphabet are mystic emblems (Vija); the visarga, the *vindu*, and the *tribindu* are manifestations of Brahma and Vishnu: from them, O goddess, proceeds Rudra the destroyer of the world; from them proceedeth Brahmá. *Vijachintámani*, I. Patala.

From an attentive examination of these and such like mantras and the religious terminology of the Bráhmans to which the Buddhists are very largely indebted, it appears that the phonetic particles which constitute the peculiar characteristic of mantras are crude terms, coined to indicate the essence of the divinities to whom they are assigned and to stand as their representatives. They are formed generally, though not invariably, by the addition of the *anuswar* or the *visarga* or both to single or compound consonants, and are used either singly instead of the name of the gods or goddesses to whom they are sacred, or in connexion with their names as compound terms, without being subjected to any grammatical regimen. When inflections are used the names are put in the nominative, the accusative, the locative or the vocative case, the meaning being in the three former cases that the emblem stands for or exists in the divinity of that name, and in the latter a mere interjection. The use of the locative, however, is confined among the Buddhists. In mantras adapted for the destruction of enemies, or for the neutralization of poisons,—the name of the god to whom they are addressed is generally put in the nominative case; but this construction is confined to the mantras of the minor divinities.

According to the above deduction the three formulæ of the inscription may be explained as follows:—

1st. Om the deity is in Arapachâni who (or whose emblem) is hrih.

2nd. Om the deity is in Manipadma who (or whose emblem) is in hum.

3rd. Om the deity is Vajrapâni who (or whose emblem) is hriñh.

Both the Buddhists and the Brahmans regard their *vija mantras* with the greatest veneration as the most sacred emblem of the Deity, but while the former, actuated by the exclusive spirit of their religion, hold out the most dreadful imprecations against him, who should venture to repeat a vija mantra in the presence of a fellow-man, the latter proclaim it every where and at all places, alike on the road side and at the market place, as in the vihára and the closet, and in the same breath invite the most revered Lámá and the detested Chandála to avail themselves of its aid, and secure for their erring souls, immediate and eternal salvation.

No. 3 of Plate XV. is the facsimile of an inscription found by Capt. Pearse, of the Madras Cavalry, in a small mound in the village

of Shah Dhairi, on the high road from Rawal Pindi to Hazara. The record was originally inscribed on a narrow slip of copper 9½ inches by ⅝ths of an inch, which has been, apparently by some accident, broken into four fragments; the characters are Arian and the language is Páli. I have seen a tentative reading of this by Mr. E. Thomas, of the Civil Service, in which occur the words "*Áyanachandra*," "*viveka*" "*viphala*," but have not as yet been able to make out its purport.

Account of a visit to the Shrine and town of Sakhí Sarwar in the Lower Deráját; with a notice of the annual Melá or Fair held there.—By Lieut. H. G. Raverty, *3rd Regt. Bombay, N. I. Asst. Commissioner, Múltán.*

"Friends of my heart, who share my sighs,
Go seek the turf where Kásim lies,
And woo the dewy clouds of spring,
To sweep it with prolific wing.

Within that cell, beneath that heap,
Friendship, and truth, and honour sleep,
Beneficence that used to clasp,
The world within her ample grasp."—Hasan-al-Assady.

In the month of April, 1853, whilst stationed in the Deráh Ghází Khán district, I took the opportunity of paying a visit to Sakhí Sarwar, a small town celebrated for its famous Shrine bearing this name—situated on the western skirt of the mountains, the continuation of the Súlimán range; and where an annual *Melá* or Fair is held, which is attended by several thousands of people.

The Fair commences from the first of *Bysákh*—the first month of the Hindú year, and continues during the two following days. On the year in question, it fell on the 9th, 10th, and 11th of April; and people—both Hindú and Mussulmán—with their families, were flocking to it from Sindh, Bháwalpúr, Jesalmír, and even as far east as Delhi, as well as from all parts of the Panjáb.

They at first assemble in the town of Deráh Ghází Khán; and on the two last days of the month of *Chaitrr* they commence their journey. The first stage is by Chowrutta to Vidor or Widor, a distance of about eighteen miles, as far as which water is procurable. Here they

halt for the night, it being necessary that they should reach the end of their journey on or before the morning of the first of *Bysákh.*

On a reference to my notes, I find that I left Deráh Ghází Khán, accompanied by that fine old veteran Malláh Khán, a Resáldár of the Deráját Mounted Police, and two Sowars of the same corps, at 2 P. M. on the 9th April; and reached Chowrutta, a small village to the left of the road at half-past 3. The whole of the way from Deráh to this place, a distance of about nine miles, was one continuous string of camels with gaudy trappings, ponies, horses, and bullocks, besides crowds of foot-passengers, all hastening to the Fair.

"The roads were clad frae side to side
Wi' monie a weary body,
In droves that day."

There were men, women, and children; but by far the greater number—as usual on such occasions—were young women in *Kajáwahs* or litters on camel's backs; and numbers of them were exceedingly pretty. All seemed in high spirits, and roguishly inclined, if we may judge from the sparkling glances of their dark eyes.

The same scene occurred as far as the village of Widor—another nine miles,—which is about half way, and where I arrived exceedingly thirsty at about 5 P. M. The water here is horrid, and is as black as ink; in fact the sight of it is almost enough to give one the plague. As I have said before, I was very thirsty, and there being no time to mince matters, I was obliged to take a dose, which I managed by holding my nose with my fingers, so as to at least get rid of the smell, if I could not of the flavour.

The people, that is to say the fair-going ones, halt here for the night, on account of there being no water between this and Sakhí Sarwar, a distance of about sixteen miles, with the exception of small quantities procurable from the Belúchís who station themselves along the road and dispose of it at about a half-penny per cup.

I had left the old Resáldár and one of the two Sowars (who were rather sparing of their horses) behind, between Chowrutta and Widor; so I set out from the latter place with one Police horseman, and four Belúchís of the Laghárí tribe, furnished by their chief—Jellal Khán—in whose district we then were. We passed through a bare and desert tract of country gradually approaching the hills

to the west, which are perfectly bare, and to all appearance different to any I had ever seen, inasmuch as they seemed, from their singular abruptness, to be almost inaccessible. About two miles distant from Widor we came upon stones and pebbles, and a peculiar clay which from its great hardness might be mistaken for stone. This is mere debris from the hills forming as it were a belt of some eight or ten miles in breadth that joins and runs parallel to the rich alluvial soil of the Indus, which on the right or western bank is about twenty miles broad on the average.

We now passed the remains of a well which that popular ruler—Dewán Sáwan Mall, Názim of Múltán—attempted to sink for the convenience of the visitors at the *Melá* or Fair, but without success, having found it impracticable after employing workmen on it for about a year. It now appears like the remains of a tank. Some four miles from the end of our journey, to the left of the road, there is a platform of stone and lime, built by one of the votaries of Sakhí Sarwar, round an aged tree. It is said that this tree remains in leaf for twelve years at a time, and for a similar period bare and blighted. The ninth year of its blight has passed, and in another three, *they say*, it will again put forth leaves. By all accounts, however, it appears that the tree has been dried up in this state for the last fifteen years or more. The trunk contains several iron nails or pegs, which have been driven in by deluded people having some wish to be fulfilled. It is usual to drive in a nail one year, and the year after, if the desired object has been acquired, to come and draw it out again. The Hindús have also plastered over the trunk with red lead in the same manner as they are in the habit of anointing their gods. When they reach the tree they make their prostrations to it calling out the name "*Laalí wallah*,"* not Sakhí Sarwar; for they say that four rubies are suspended over his tomb, but they are not visible to mortal eyes. They continue to cry out to the Saint by this name of *Laalí wallah*, and singing their hymns proceed towards his Shrine.

On leaving Widor, the sky away in the north-west was dark and over-cast, and threatened rain, which came on with violence, shortly after the sun set and attended with gusts of wind, and vivid flashes

* *Laalí wallah*—from لعل—a ruby, and والہ—a master, possessor, etc.

of lightning. There was no remedy but to make for a small clump of trees, which fortunately happened to be within a short distance; and with the shelter afforded by the ample blanket of the Police horseman—A Kanker Afghán—who with myself in the middle and my four Belúch guides with our horses huddled together in a line—those on the right and left, holding the ends of the blanket, and each holding it over his own head—we managed to hold out for some time, until the blanket got wet through, when the storm luckily passed off; and we again went on at a brisk pace to make up for lost time, as night was fast approaching.

The road became more stony and more difficult as we advanced, from the streams of water and the increasing darkness, which was only at times relieved for a moment by a vivid flash of lightning, very often disclosing our dangerous proximity to a ravine or water-course. However we succeeded in reaching the end of our journey (Sakhí Sarwar at that time of night appearing a very strange looking place) without further accident at about half-past 7 o'clock; and I was heartily glad to get into my snug tent, where I found the tea things on the table, and the kettle singing for tea—

" The very winds that sigh or roar—
The leaves that rustle dry and sear—
The waves that beat upon the shore—
They all are music to your ear:
It was of use
To Orpheus—
He charmed the fishes in the *say*;
So every thing
Alive can sing—
The kettle even sings for *tay*!"

April 10*th*.—On getting up this morning and looking out, I find I was not deceived in the idea entertained last evening as to Sakhí Sarwar's being a strange-looking place. The town as it may be termed—a collection of flat-roofed mud houses about five hundred in number—is situated on a tongue of land to the left, near the entrance of the Dalánah Pass; and is surrounded by bare and rugged hills on all but the western side. The place just below the town to the north where the Fair is held is rather open. It is the dry bed of a mountain stream, which flows only in the winter

months after heavy rains in the hills; and consists of sand and pebbles with numerous boulders. In the months of June, July, and August, this place must be a second Dádur; and what with the scarcity, as well as the badness of the water, must be fearful indeed. There are a few Kunar, Gaz, and Arák trees in the bed of the river, but with this exception, all around is bare and stony.

That side of the *Zéâ'rat* or Shrine, facing the bed of the river to the north, and that to the west, rise abruptly to a considerable height. These two sides are built up in the form of steps, seventeen in number, which are faced with lime and brick—the same materials as the buildings belonging to the *Zéâ'rat* (described in a subsequent paragraph) are composed of. These steps answer the purpose of seats for the spectators at the Fair.

The Fair does not commence in real earnest until to-morrow, and from where my tent is pitched I cannot perceive many people. There are however no less than seven whirligigs in full operation; and men and women—boys and girls, take their swing, and seem to enjoy it greatly. There are also several dancing bears and monkeys; and the usual accompaniment of *tom-toms* and other Indian unharmonious musical instruments, whose din and discord seems "to charm the savage breast." There used to be horse-races in former times; but this amusement has declined of late years, and now is almost obsolete.

Some of the Beluchis here amuse themselves with a very strange and peculiar dance. About thirty or forty assemble together and arrange themselves in a circle, each man with two pieces of wood or two stones in his hand. Then placing the left foot forward they commence to move along in an oblique direction by placing one foot over the other. During the whole time one of the party—generally the one with the best voice—sings one of their rude songs of love and war, the others keeping time by striking these strange castanets together, and joining in chorus. Sometimes they turn round, at others they meet; and having half bent their bodies place both hands over their heads. They then hiss at each other; and having again formed the ring they proceed as before described.

This afternoon, attended by the Resáldár and a few Laghárí horsemen, I went up the Dalánah Pass into the hills for about nine

miles. The road lies through the dry bed of the river which I have already referred to. It is filled with lime-stone boulders, and in many places is very narrow, particularly about three miles and a half from Sakhí Sarwar, where an immense portion of one of the hills to the right of the path fell down two or three years since, and completely blocked up the road. The second range of hills seem to be composed chiefly of limestone, running slantingly in a south-east direction towards the river; whilst the first or lowest range appeared to be entirely of sandstone. I also noticed in many places boulders of limestone mixed with sandstone, which appeared to be either in a decaying or hardening state. The whole of these hills are perfectly bare; and with the exception of a few patches of green at the foot of the hills through which our path lay, growing from the debris which had collected from above, not a blade of grass was to be seen. There were however a few dwarfish trees and shrubs peculiar to the country scattered about here and there. I went on as far I could conveniently go on horseback, until we reached a *Kotul* or Pass which from its steepness would have been dangerous to have attempted except on the horses of the country. I was now in ROH—the bugbear of the authorities, and the Alsatia of the Deráját—amongst mountains lofty and grand, some of which rise to a height of 1000 feet or more; but the scene wore a dreary, desolate, and gloomy appearance; for even the wild animals and birds appeared to have deserted it. The third or higher range, called the Koh-i-Siáh or Black Mountains, was at a long distance from us, and appeared of immense height.

It is from the bed of this river or torrent, whose windings we have been following, that the whole of the water with which the town of Sakhí Sarwar is supplied—at this period no small quantity—is obtained. The wells, as they are termed, consist of a number of holes or pits dug in the sand, and are about forty in number. The water, which is of a blackish colour and brackish taste, is found at depths varying from ten to fifteen feet from the surface. The strata consists of sand and gravel mixed with pebbles varying in quantity as the depth is increased. During the period of the *Melá*, the attendants at the Shrine make a deal of money by the sale of water, which is purchased from them both by Hindús and Muham-

madans. They fill about a thousand skins besides numbers of earthen vessels beforehand. The price per skin-full the first day, is two annas or three pence English, which increases according to the supply.

Soon after my return this afternoon the sky again became overcast; and towards sunset it came on to blow and soon after to rain, attended with thunder and vivid flashes of lightning, much in the same manner as the preceding evening; and people were now seen running in all directions to the town to escape a ducking. This was most unfortunate, as the fashionable time for the pleasure-seekers appeared to be after 4 P. M., and until long past midnight; but this unfriendly rain has completely damped the sport. The rain cleared off for a short time in the evening; but about 10 o'clock it re-commenced, and continued with violence for the greater part of the night. Knowing the sandy nature of the soil too—for my tent was pitched in the dry bed of the torrent, as I have before noticed—I was momentarily expecting the tent-pegs to come up, when down would have come the whole machine, and probably half-smothered me in the ruins.

12*th April.*—This being a fine day and the last day of the *Melá* also, I availed myself of the opportunity of taking a couple of sketches of the scenery—one of the town and Shrine of Sakhí Sarwar, the other looking up the Dalánah Pass, already noticed. To the south of the town, the road leading into the Sakhí Sarwar Pass, which is one of the routes to Kándahár through Sewestán and the Pishín valley to Kelát viâ Tull and Dádur, lies over a stony plain for about seven miles before the hills are reached.

It is said that some forty thousand people assemble on the last day of the *Melá;* but I imagine from what I saw this day, that one half the amount would be nearer the truth; still, the number of persons who visit the place during the latter part of March and the beginning of April, cannot be far short of fifty thousand. There is no kind of trade carried on here, such as at what are generally termed Fairs, being altogether of a religious nature; but I think that a commercial Fair might be opened at this time with very great advantage, and with every chance of success. It certainly would be a very favourable opportunity to try the experiment.

The town of Sakhí Sarwar contains about five hundred houses, and about 2,500 inhabitants, out of which number, the attendants at the Shrine, including young and old, amount to 1,650; and who, within the last thirty years, (according to their own account) have never been below or above this number. Each of them, whether "the infant, mewling and puking in the nurse's arms" or "second childishness and mere oblivion," each is entitled to an equal share of the offerings made by the visitors at the Shrine.

The Shrine itself is enclosed within a building with high walls about seventy paces in length and breadth, which is entered by a lofty gateway with minars from the south side. Three sides of the interior are open, but to the north there are two buildings opening one into the other. The eastern one, the pilgrims assemble in: the western apartment contains the tomb of Sakhí Sarwar, which is breast high and covered with a black pall. At the head is placed a green turban over which the visitors strew flowers On this side, seated on the floor, is the *majáwir* or attendant who receives the money, before whom are heaps of copper coins and cowrie shells, which have been thrown there by the humbler class of pilgrims. The larger sums, from a rupee upwards, are placed on the tomb itself. From the personage just referred to, each visitor receives a small string to fasten round the neck, which is made of black lamb's wool, and is considered a powerful charm by the simple-minded people. The Shrine-room is quite dark, and so exceedingly close from want of ventilation and from the oil of the lamps which are continually burning, as to be almost unbearable to any one but a native. The walls too from the smoke from the lamps have become quite black. The whole range of buildings is strongly built of brick and lime.

It is imperative on all pilgrims coming here, to sleep on the ground; and I imagine that such a thing as a *charpai* or bedstead will not be found in the whole place. The reason advanced is, that as the cold earth was the martyr's bed, so must it be the bed of his votaries also.

The town also contains about sixty shops, of whom ten are occupied by sellers of sundries, such as needles and thread, women's bracelets, drawer strings, and such like nick-nacks; six sweetmeat-sellers; and the remainder sellers of grain, flour, sugar and ghee.

There are no shoemakers or any other artisans, except a few tanners.

In the afternoon of the last day of the *Melá* the visitors begin to draw off, and by the next day the place is deserted. To avoid confusion I left a short time after two P. M., attended by the same party of Belúchís who had accompanied me from Widor, and one Police horseman who acted as my orderly. At half-past three o'clock, having again lost the Resáldár on the road, we reached the latter place—a distance of sixteen miles; and after devoting a quarter of an hour to breathe the animals, at the request of my Laghárí guide, I exchanged the fine mare which had carried me so well thus far, for the one he had ridden, as I had the advantage of being a lighter weight, he taking the mare of another of the party whom we now left behind at Widor. By degrees the party—now consisting of five persons—began to diminish—at first one, and then another dropped behind—and by the time I had arrived within a mile of Deráh Ghází Khán, the Police Orderly Sawar alone remained with me. We reached Deráh at a quarter-past six, having come a distance of thirty-six miles in three hours and a quarter, the policeman's horse having carried him the whole of the way. The Belúch mare too had not done less, for she had carried her master one half, and myself the other half of the distance. Both animals could have gone much farther had it been necesssry. This speaks well for the endurance of the horses of this part of the country—celebrated in the writings of classical authors as the land of the Aswádhyas—the country rich in steeds.*

The following tradition respecting Súltán Sakhí Sarwar, I have extracted from the account of his life contained in a small book, the property of one of the attendants at the shrine, which was kindly lent to me for that purpose.

HISTORY OF SU'LTA'N SAKHI' SARWAR.

"The real name of Súltán Sakhí Sarwar was Suyed Ahmed, but he is best known amongst his disciples by the former name. His father was Suyed Zain-ul-Abadín, bin Suyed Omar, bin Suyed Abd-

* The Ossadii also sent ambassadors tending allegiance. Who these different tribes were, it is not possible to ascertain; their names were apparently Indian. The Ossadii may have been the people to the west of the Indus—the Aswádyas, the "rich in horses." Wilson; Ariana Antiqua, page 201.

ul-Latíf, bin Suyed Shaikah, bin Suyed Ismáæíl, bin Suyed Imám Mousa Kázim, who was one of the twelve Imáms, and the sixth in relation from Alí the son-in-law of the prophet.

"Zain-ul-Abadín—the father of Sakhí Sarwar—was one of the attendants at the tomb of the prophet at Madína. One night in a dream he saw the Prophet standing beside him, who gave directions that he should proceed direct to Hindústán,—the people of which country having lost their road to the true faith, were groping about in darkness—for the purpose of bringing them again into the right path. He accordingly set out for India; and after some time spent on the road, he at length reached the village of Sálkot which lies about fourteen or fifteen miles to the south of the city of Múltán. He first led back the people of this place to the path of orthodoxy; and after residing here for some time, Rehán Khán, Afghán, who entertained great respect and friendship for the Suyed and venerated him for his piety, gave him his daughter in marriage. By her he had two sons—one Suyed Ahmed, known as Súltán Sakhí Sarwar, and the other Suyed Dhodá. After some time he took the daughter of Suyed Abd-ul-Khálík as his second wife, and by her had three sons—Da'oud, Muhammad, and Sohárah. Zain-ul-Abadín at length died, and was buried at Sálkot, above referred to;* and Súltán

* From enquiries made since the above was written, I find that there is a small village near Kotlab Nijábat in the Pergunnah of Múltán, at present known by the name of Sháb Kot, situated about fourteen miles south of the city. Its former name is said to have been *Seh Kot*, (Three Forts) and has been inhabited for the last hundred years; but the three Kots or Forts, from whence its name is derived, are now in ruins.

Near this village there is a place enclosed within four walls, in which there are three *Khánkas* (small domes or chapels) each of which contains a tomb. The first is that of Suyed Zain-ul-Abadín, who died about 670 H.—1271-2, A. D.; the second of his wife Bíbí Æyá; and the third of Suyed Máhmúd their son. In the month of Asarah (June) a *Melá* or fair, or more properly speaking, an assembly of the votaries of the defunct, is held here, and numerously attended.

Zain-ul-Abadín is said to have had four other sons—one Sakhí Sarwar who died about 690 H.—1291, A. D.; and whose tomb is situated at the village bearing his name, in the hills west of Derán Ghází Khán; the second Hírab; the third Suyed Da'oud who died at Bokhárá; and the fourth Abd-ul-Ghanní who died at Ramak, a small district near Ghazní, inhabited by the Lohání Afgháns.

The tombs which are in a very dilapidated state, formerly bore inscriptions in Arabic; but they have long since become entirely defaced.

Sakhí Sarwar, who was remarkable for his piety succeeded to the religious honors of his parent.

"After some time, Súltán Sakhí became desirous of travelling and wandering about the world, as is the custom of such devout persons, in order that they may confer the benefit of their sanctity and piety on others. One day he was seated near the banks of a river (the Chínáb probably) when he saw a mare, very thin and weak from great age, grazing at a short distance from him. Perceiving the emaciated state of the animal he said unto her, 'Graze and become fat;' and by the favour of the Almighty, after a few days the old mare had improved so much in condition and appearance, as to be even preferable to a younger animal. After some time a water horse came out of the river and copulated with the mare, and from this connection she brought forth a *sammand*, or dun-coloured female colt. Subsequently a person of the neighbouring village happened to discover the mare in the jungle, not only exceedingly sleek and in good condition, but also with a fine colt at her side. On his return home he lost no time in mentioning the circumstance to the owners of the animal, two brothers by name Ahmed and Máhmúd, who also resided in the village. They were much astonished at what he told them, for the mare had become so very weak and thin from extreme old age, as to be useless to any one; and disbelieving what he had told them, they said the beast must have been devoured long before by the wolves and jackals. The man persisted that what he had said was true, and swore by the Prophet's beard to the truth of his statement. The brothers being now somewhat convinced went along with him, and found that the man's statement was perfectly correct; and they returned home, bringing the mare and foal along with them. The account of this remarkable occurrence spread far and near, and astonished every body.

"At length Súltan Sakhí himself expressed a wish to purchase the colt; and requested some of his disciples, of which he had now gained a great number, to mention the same to the owners, and say that he would give them whatever price they might ask for it. They went accordingly, and expressed the holy man's wishes to the brothers; but the unfortunate wretches would not consent to part with this foal under any terms. At length, however, calamity befel

the brothers—sickness and poverty overtook them—and setting this down to the effects of Súltán Sakhí's anger against them for refusing to part with the dun colt, they now came to him, at the same time bringing the animal; and requested he would forgive the past, for that the Almighty had brought all these misfortunes on them in consequence of the Suyed's anger. They were accordingly forgiven; and after having presented a *nazaránah* or present given to a superior, they became the Suyed's disciples.

"One day Súltán Sakhí mounted on his steed set out unaccompanied from the village, and went to a lonely and desolate place he had selected, where he fasted for a period of forty days. During this period the mare was tied up near by. At this time some people, who by chance happened to pass that way, saw a young man, whose forehead was illumined with the light of piety, and on whose countenance the stamp of sanctity and devotion was impressed, engaged in prayer; and a little on one side of him was a mare which had been secured with head and heel ropes. Now the three pegs to which these ropes had been fastened had taken root, and had shot up into young saplings. On reaching a hamlet which was not far off, they mentioned to the people there this remarkable circumstance, and they equally astonished, and filled with veneration, numbers of them became disciples of the holy man.

"On the termination of the forty days, Súltán Sakhí set out in company with his new proselytes, for the city of Múltán, which at this time was governed by a ruler known by the name of Ganno. The people of this Prince hearing of the arrival of the *Sarwar** with his followers, reported to their master that a Husainí† had arrived there, accompanied by a dun steed which had such eyes as had never been seen in any animals before. The Prince on hearing this account determined to visit the holy man; and taking with him an Irákí horse, and a sum of money as an offering, he set out for the temporary residence of the Suyed. Having presented his *nazaránah* he expected to have obtained in return the dun mare, which indeed was the real object of his visit, and was going at length to demand it of Súltan Sakhí; but the tongue clave to the roof of his

* *Sarwar*,—a prince, sovereign, leader, lord, &c.

† *Husainí*,—the name of a sect, the followers of Husain the son of Alí.

mouth, and he could not utter a word. After some time however he recovered the faculty of speech; but he took his leave without again attempting to make known his wishes.

"After the departure of the Prince the Saint's followers came to him and begged that he would give them the Irákí horse which God had thus bestowed on him, to do what they liked with. He resigned the animal to them; and they took and slaughtered it, and cooked and ate up all its flesh. The enemies of the holy man who happened to hear of this, went and gave information to the Prince of Múltán, who forthwith sent and demanded back the Irákí steed and the money which he had given. The Suyed, who had become aware of the object of the Prince before the arrival of his messengers, now purified himself, and went out into a solitary place and commenced praying—"Oh God! Oh Almighty Father! thou hast the power to restore the dead to life, as well as to bring the living unto death! make not this thy unworthy servant contemptible before the wicked and iniquitous!" The horse was forthwith restored to life; and the heart of Sakhí Sarwar was moreover comforted by the words, 'Fear not,' which greeted his ears from an unseen and invisible speaker. The messengers from the Prince now arrived, and demanded back the Irákí horse together with the money. They were requested by the Saint to go to his disciples and demand them; and to state at the same time that it was his wish they should be restored. When the Prince's people reached the dwelling of Sakhí's followers, to their great disappointment, they found the horse alive, on which they returned to their master ashamed and disgusted. The Prince himself no less displeased at his own conduct, went and begged for forgiveness. The Saint assured him that he entertained no enmity whatever towards any one; and requested him to set his mind at rest in the matter. The Prince overcome by the forgiving disposition of Sakhí Sarwar, became his disciple forthwith; and as a proof of his regard for him, he gave our Suyed his daughter—Bíbí Bá'ie—to wife. From this connection a son was born, who was named Rú'i-ud-Dín, better known as Mí'áh Ráná.

Súltán Sakhí Sarwar took up his residence at Múltán, intending to end his days there; but there is no remedy for mortal man in this Vale of Tears without dying the death:—

"Believe not Fate at thy command,
Will grant a meed she never gave;
As soon the airy tower shall stand,
That's built upon a passing wave." MUHAMMUD AL-TAHMANY.

"A disturbance now broke out in the vicinity of Múltán; and it was currently reported that the Káfirs or Infidels inhabiting the mountains near the Indus—distant some sixty miles to the west—had assembled in great numbers, and had killed and plundered the property of the Faithful residing in that part of the country. This was soon after corroborated by a number of the injuried parties appearing at Múltán to make known their wrongs to the powerful Muhammadan chiefs there; and demand their aid, and that of their brethren of the Faith in general, to enable them to take revenge on the Infidels. Súltán Sakhí Sarwar was one of the foremost to render the succour they sought; and he accordingly set out to oppose the Infidels, taking along with him his brother—Khán Dhodá, and Mí'áh Ráná—his son by his third wife, Bíbí Bá'ie—who also accompanied her husband and son. Núr, Omar, Issák, and Alí—his chief and most favoured disciples, together with several horsemen, also went with him.

"When they had reached the hills where the Zíá-rat or Shrine now stands, they attacked the Infidels and put them to the rout; and from thenceforth the Saint took up his residence, much against the advice of his followers and friends, at the village where his ashes now repose. After a short period however, the Káfirs again assembled in great force and attacked the holy man and his followers, who opposed them to their utmost, until the four disciples were slain, and obtained the crown of martyrdom. The head of the Saint had been severed from his body by the sword of an Infidel, (may dogs defile the graves of his forefathers and descendants) but the headless trunk, still continued to oppose them for a period of four days. At length, near the skirt of the hills, on a rising ground where the tomb now stands, Súltán Sakhí Sarwar sank down under an Arák tree and breathed his last."

"Tyrant of man! imperious Fate!
I bow before thy dread decree,
Nor hope in this uncertain state
To find a seat secure from thee." ALÍ BIN MUHAMMAD.

The attendants at the Shrine still show several pieces of this Arák tree, which are kept carefully wrapped up in a piece of cloth.

The disciples say that Mí'áh Ráná, and Khán Dhodá did not perish here; and that after the death of Sakhí Sarwar they set out for Bághdád. The book from which I have taken the preceding legend, however, is silent as regards Khán Dhodá; but it is stated therein that Mí'áh Ráná, and his mother—Bíbí Bá'ie—after the martyrdom of the Saint, prayed unto the Almighty to deliver them from the hands of these Philistines; and that the earth having opened almost immediately, they for ever disappeared from mortal ken.

The grave of Núr and Issák is on a neighbouring and more lofty hill, about five hundred paces to the west of the Shrine. It consists of a platform about eleven yards long by eight broad, and four yards high. On the top of this is a smaller platform on which are two tombs. The grave of Omar and Alí is situated a little to the north of the sepulchre of Núr and Issák, and is marked merely by a mound of stones or cairn, erected where they fell.

"If I must fall in the field, raise high my grave, Vinvela. Grey stones and heaped-up earth, shall mark me to future times. When the hunter shall sit by the mound, and produce his food at noon, 'Some warrior rests here,' he will say; and my fame shall live in his praise." Ossian.

Again to return to the book. "For some years the fact of the death of Sakhí Sarwar remained unknown, and at length had almost been forgotten; for the Mussalmans of those parts had been exterminated. At length one Malik Esau, a merchant, who was proceeding from Hindústán to Bághdád, chanced to halt for the night at the place where the town now stands, for it lies in the direct road to Kándáhar and Persia. His servants were busily employed preparing the evening meal, when what do they see but the vessels filled with blood! Dismayed at this, they ran and acquainted their master with the circumstance. He too, astonished at what had happened, stated that the place they were then standing on must have been the scene of martyrdom, or was the burial-place of some holy person; and he therefore directed them to prepare the victuals at a greater distance off.

"At midnight, when it was time to load the baggage animals and proceed on their journey, the large camel which carried the merchant

suddenly became quite lame, and consequently he was under the necessity of sending on his fellow-travellers, and his own people, with the baggage, to the next stage; whilst himself and son remained behind intending to await the morning's dawn, in hopes that the camel might be able to follow. When morning drew nigh, three horsemen made their appearance coming towards them from the hills, one of whom having advanced before the others cried out:—'Oh Malik Esau! why art thou sitting thus sorrowful and distressed?' The merchant answered:—'How can I be otherwise when my companions have proceeded on their journey, and I am left alone here in this desert with my son—my camel lame, its load on the ground, and no other animal to supply its place?' The horseman who was no other than the Sarwar himself, said:—'Fear not, for by the time the day dawns your camel will be well again. Load him and set out on thy desired journey; and when thou shalt have reached Bághdád, make known unto all people that in Hind, at a place sixty miles west of the city of Múltán, on the skirt of the hills, there is a place of martyrdom; and whosoever falleth into calamity and goeth there, shall, by the will of God, escape from it.'

"Malik Esau on arriving at Bághdád related the wonderful accident which had befallen him on the journey, and as directed by the apparition, but no one would believe him; so Esau to convince them of the truth of his statement killed the camel, and from the leg which had been affected with lameness on that occasion, he took out several iron nails. The most incredulous were now convinced; and shortly afterwards two sick persons with their families set out on a pilgrimage to the grave of Súltán Sakhí Sarwar. One named Khoker was blind, and the other called Langá was afflicted with the leprosy; but on their arrival at the scene of the martyrdom of the Saint, they were by a miracle restored to perfect health, and confidently believed that he would appear unto them. They were not disappointed; for they had not been dwelling there very long before three horsemen came out of the hills one day and made towards them. They comforted them greatly, and bade them reside there altogether and take care of the remains of the Saint, promising at the same time protection from all ills. The horsemen stayed with them and said the *æasar* or meridian prayer, after which they disappeared as they had come.

"The next person who came and took up his residence at this place was one named Shaik who was impotent; and he too recovered and became an attendant at the tomb. The present attendants are descended from these three persons already mentioned, and constitute three different families—Khoker, Langá, and Shaik. The former are considered the principal, and are the most numerous: the Langás are the next in rank. In the course of time one Ahmed Khán, an Afghán, took up his abode here; and having attained the object of his wishes, he became a permanent resident, and a follower of the Saint. By the assistance of Ahmed Khán, for he was a wealthy man, they built the tomb over the ashes of Súltán Sakhí Sarwar, and from that time to this, people from all parts. both Hindú and Muhammadan, have sought it as a place of pilgrimage; and he whose heart is pure and clean, by coming here attaineth the object of his wishes."

Such is the legend of Súltán Sakhí Sarwar, whose odour of sanctity is so great as to draw crowds of people—Hindu and Muhammadan, Sikh and Belúch—yearly to his Shrine from all the surrounding countries.

The greater number of pilgrims who seek the Shrine are young women with old husbands, and those who may not have been blessed with children; many sick persons also come in hopes of being restored to health; and others to obtain increase of worldly goods. These make a small offering in money and vow to give a larger sum at the ensuing *Melá* if their wishes shall have been fulfilled. Sick people too, who may be unable to attend in person, make their vows by proxy, to present a certain oblation the next year should they recover their health.

It is related that a certain man, one of whose eyes had been affected with a disease for a long time, made a vow that if he should recover the use of the organ, he would present an eye of gold at the Shrine of the Saint. He recovered the use of it, and caused the golden eye to be made, as he had vowed he would do, with the intention of placing it on the Shrine in person. It was near the time of the *Melá;* and it so happened that one of the attendants, who was blind of an eye, being out as usual collecting contributions and donations in the name of the Saint, heard of the matter of

the golden eye, and the man's determination to present it in person. He therefore went and endeavoured to persuade him against undertaking so long a journey, saying that there was no necessity whatever for so doing, for he would himself present the oblation, and thus save him the trouble of going in person. He also urged as a reason, that the sooner the offering was made, the greater would be the merit, and therefore no time should be lost. A wag who was present, on hearing this, asked the disciple, whether the Saint really had the power of restoring sight to the blind. He answered that he had the power of granting every thing, and of fulfilling all desires. "If such be the case, says the wag, how is it that you are blind of an eye? He should at least have restored your sight, who are a servant of his threshold!" The attendant replied. "Do you not know, Oh, sinful man! that whatever the Saint grants to his votaries he takes from his *Majáwiran*,* and gives the latter something else in exchange? At the time of my birth he took the sight of my eye, and preserved it for the use of his votary, and determined that the eye of gold should be mine; therefore this man who has received my living or human eye, should give me the eye of gold, in order that thus right may obtain right."

The most respectable and enlightened Muhammadans of the district, such as Mullas and others, say that Sakhí Sarwar himself was doubtless a very pious and holy man, as is proved by the mention made respecting him in several books under the name of Suyed Ahmed; but they consider this *Melá* and its consequences in direct opposition to the rules and tenets of the true Orthodox Faith; and probably it would be so considered, even by the Suyed himself, in whose honor, and in whose name it is held.

The more southern districts of the Panjáb are remarkable for the number of *Melás* or Fairs. In the Múltán district alone there cannot be less than some scores in the course of a year.

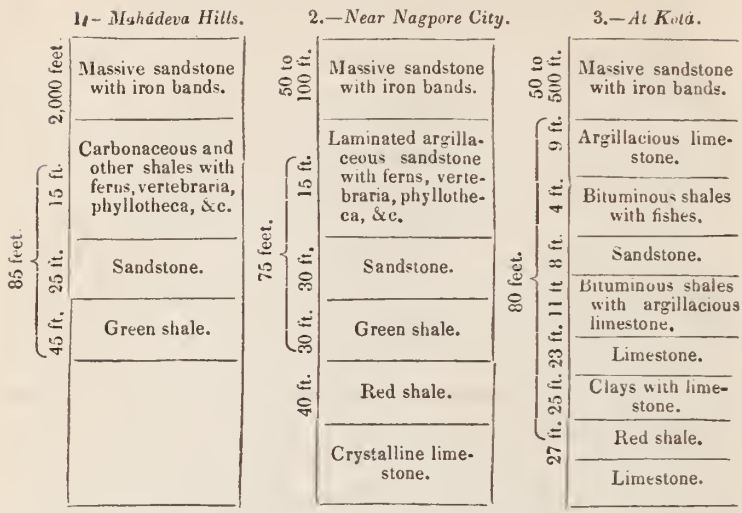
Múltán, June 6th, 1855.

* مجاور *Majáwir*.—an attendant at a mosque, and devoutedly employed or attached to it.

On the age of the Coal strata in Western Bengal and Central India.—*By Rev.* Stephen Hislop, *Nagpur.*

The age of the coal field of Newcastle, Australia, has been a subject of discussion to as great an extent almost as the geological position of our Indian carbonaceous strata. For my own part, I have been inclined to acquiesce in the view of McCoy, who, in the An. and Mag. of Nat. Hist. vol. XX., endeavours to prove that the beds with vegetable and those with animal remains belong to different formations,—that the former are Oolitic, while the latter must be referred to Palæozoic times. Not having his paper at present in my possession, I cannot now adduce the arguments by which he seeks to establish his opinion; but it is of little consequence, as the evidence, which I shall bring forward, in the sequel, on the age of our Indian coal measures, will be independent of the Palæozoic or Mesozoic character of those of N. S. Wales.

Perhaps the most interesting part, in a section of the rocks of Central India, is the junction of the massive sandstone above with the laminated strata below. The latter, however various they may be in different localities as regards their lithologic and sometimes even their palæontologic features, may readily enough be distinguished by their relation to the superior beds, whose identity again is sufficiently attested by the iron bands, which run through their mass. This ferruginous sandstone is well developed at the Mahádeva Hills, in the north of the province of Nagpur, in the vicinity of the city itself, and at Kotá on the Pranhítá, in the dominions of the Nizam. The subjoined sections represent the succession of the strata at these places respectively, as far as they are known:



In the preceding sections the dimensions depend partly on inference with the exception of those of No. 3, which were ascertained exactly by the measurement of the late Dr. T. L. Bell. They are, however, I believe, sufficiently accurate for the purpose for which they are given. That purpose is to exhibit the similarity, which exists among all these sections. Immediately under the upper sandstone, laminated rocks are seen in all. In section 1st, the shales are bituminous and carbonaceous, while in section 2nd, they are of argillaceous sand. But that they are of the same age, there can be no doubt, as many species of fossils are common to both. In comparing sections 1st and 3rd, we find that the latter instead of having the limestone all collected in the lower part of the section, as is the case at Nagpur and in many parts of the Nizam's country, has it interstratified with the shale; but leaving this peculiarity out of view, we perceive that in it the bituminous strata occupy the same position as in section 1st. The difference in organic remains between these two sections is more than counterbalanced by their agreement in the sequence of the inferior rocks, which (still omitting the interstratified argillaceous limestone from section 3rd, and choosing section 2nd as being better known for comparison with it, instead of section 1st) gives us in descending order sandstone and clay, red shale and limestone.

Now, if the fern-bearing coal shales and laminated sandstones of this province be the same as the fish-producing bituminous shales of Kotá, then the light, which the last mentioned beds afford regarding their own age, may be cast back on the other two. It is satisfactory to find, that the evidence supplied by the Kotá fossils is that of animal remains. The fishes that rewarded the researches of Drs. Walker and Bell have been pronounced by Sir P. Egerton to be true Oolitic forms, and probably of the age of the Lias; and therefore our vegetable organisms can be no older. To make this part of the evidence complete, and with the view of introducing some remarks on the testimony of our fossil plants, I may here mention, that between Nágpur and Chándá, at both of which places the upper sandstone has the usual iron bands, and the bare laminated beds the common vegetable remains, there is a district with Mángali as the centre (sixty miles S. of Nágpur) where the superior sandstone is less ferruginous, and the inferior or laminated beds are coloured by iron of a deep brick red. In the latter strata, where, from the analogy of the country both South and North of them, we should expect an abundance of ferns and stems, the remains of reptiles, fishes and entomostraca predominate, while the few vegetables that are found, are generally very different from those occurring in other parts of this territory. And yet from the position of this sandstone I have very little doubt that it is the same as that of the more ordinary appearance. The teachings of its Fauna are interesting. The skull of a Labyrinthodont, named by Owen *Brachyops laticeps*, might suggest for it a Triassic or even Carboniferous age, but the plentifulness of scales of lepidotoid fishes forbids us to assign a more ancient epoch than the Jurassic; and the conclusion is unavoidable, not that our laminated sandstone is older than the age we have attributed to it, but that the Labyrinthodont family has come down to a more recent period than is generally believed.

But now it is time to inquire what we are to learn from our fossil *plants*, regarding the age of the carbonaceous shales and laminated sandstone of this province.

The testimony of vegetable remains I do not reckon of trifling value. When they belong to a large genus like *Pecopteris*, which

has run through many successive changes of the earth's surface, than the information they supply is not very precise. But the very same may be said with greater force of the genus *Terebratula* in the Fossil Fauna. And I have observed that, even among plants of an undecided character as regards genus, there is generally some form, which distinguishes the species of one epoch from those of another. Besides, a geological age may be known from the abundance of a genus or family of plants at one period as compared with others. Though the discovery of a single species might not decide the question, yet if the genus, to which it belongs, culminates in a certain formation, and a particular stratum presents an unusually large proportion of that genus, then some idea may be formed of the age of that stratum. Such is the case with the entire fronded ferns. They reached their maximum development in the Jurassic period, as the Oolite of Scarborough, Stonesfield, and, according to H. Miller's recent researches, of the North of Scotland, plainly shows; and one of them, the genus Tæniopteris, which is so fitly associated in our carbonaceous strata with Glossopteris and Cyclopteris, is almost confined to the Oolite, there never having been an example of it hitherto met with in the true coal measures.

Having said thus much on the general principle, I proceed to apply it to special instances. There are three localities with which our strata admit of comparison—Stonesfield and Scarborough in England, and Richmond in Virginia U. S. The slate at the former British locality and the carbonaceous shales and sandstones at the latter, are universally acknowledged, I believe, to be Lower Oolitic; while the American coal formation referred to, is generally assigned to the same era. Now the connexion between our strata and the Stonesfield slate seems to be, the abundance of *Tæniopteris*, and a resemblance among the fruits or seeds. The similarity to Scarborough consists in the presence of what Lindley and Hutton call *Equisetum laterale* with its deciduous discs at the joints of the stem, a plant, which to the best of my knowledge has hitherto been discovered nowhere else. The relation to Richmond is more intimate still, *Tæniopteris magnifolia*, found there by Prof. W. B. Rogers, appears to be specifically identical with one of the same genus here; and the descriptions given of the Virginian *Calamites*

erroneously so-called, correspond exactly with the *Phyllothecas* of Central India. And if we are to count the strata of Mángali among the representatives of our carbonaceous shales, then they furnish other two points of comparison with the Richmond coal basin, viz. in a *Knorria*, and another stem, resembling a *Lepidodendron*, but which may be called an *aphyllum* or perhaps *Aspidiaria*. I might here add a third link of connexion between those Mángali and Richmond beds, viz. the occurrence of two forms of *Entomostraca* belonging to the genus *Estheria*. But in this instance, the evidence of the Fossil Fauna is not so distinct as that of the ancient Flora. The inference to be drawn from a particular species of *Tæniopteris* being common to the rocks of Eastern Virginia and Central India is, in my opinion, conclusive as to their contemporaneousness; but not so that drawn from the discovery of *Estheria* in both, as the genus just named, after having been too frequently taken for a mollusc, is now recognised in the carboniferous formation, and, I believe, the old red sandstone, as well as in the Lias, the Oolite, and the Wealden. Judging from Sir C. Lyell's figure, there is a great agreement between his species and ours, but when Rupert Jones, one of our best authorities in this department, is able to pronounce upon them, his decision will set the matter at rest.

I suspect that a good many other instances of resemblance between our fossil plants and those of admitted jurassic strata might be pointed out; but materials as yet are deficient. There is still wanting a revision of our ancient flora, discriminating between true Carboniferous and Oolitic types. For example, how long have all furrowed stems in Europe and America, and I need not add India also, been referred to *Calamites* and more rarely *Equisetum*, whereas many of them, viz. those characterized by the absence of tubercles, and the opposite arrangement of their sulci, must undoubtedly be classed under the genus *Phyllotheca*. To establish some such clear distinction as this, is a step towards the determination of the age of the rocks, in which those stems are respectively met with; while an alternate furrowed tuberculated stem is never found in the Oolite, on the other hand, the stems destitute of tubercles and with opposite sulcation almost exclusively occur in that formation.

Hitherto my remarks have been confined to the carbonaceous strata and laminated sandstone of Central India. In now including the coal measures of Bengal in my comparison, I must bespeak indulgence, as I have personally examined none of the strata or fossils of that part of India, and must depend wholly on the descriptions and a few figures that have already been published.

By "coal measures of Bengal" of course I do not understand those on the N. or N. E. of Calcutta, some of which doubtless belong to a Tertiary age; but I mean those on the W. and N. W. of the Indian Metropolis, of which the strata in the Dámúdá basin may serve as a specimen.

These strata, I consider to be the same as what we have in the north of this province, and therefore, if my previous reasoning has been sound, they also are to be regarded as jurassic. The grounds of my identification are 1st, similarity in organic remains, and 2nd in geological position.

1. *Similarity of organic remains.*—In the bituminous shales of the Mahádeva we have the following Bengal fossil plants: *Tryzygia speciosa*, *Vertebraria indica*, and a species of *Phyllotheca*, a fragment of which is figured by Dr. McClelland as *Poxcites minor*. Geol. Jurn. Tab. XVI. f. 4. In the carbonaceous shales of Umret, besides the *Phyllotheca* now alluded to, another stem, but unfurrowed, which seems to resemble McClelland's *Poxites muricata*. Tab. XIV. f. 6. In the laminated sandstone of Kámpti, in addition to *Vertebraria* and the two *Poacites* as above, *Tæniopteris*, perhaps of the same species as at Rájmahal, and McClelland's *Pecopteris affinis*, Tab. XIII. f. 11 *b*., which in our specimen, is seen to be a well marked species with a tripinnate frond.

In all these localities, the genus *Gloscopteris* abounds, but it is so difficult to represent in a figure its minutely anastomosing venation, that nothing but a comparison of specimens side by side would warrant the identification of species. However, there is little fear of any of the Bengal ones failing to find a match among some of ours, as from the sandstone and coal shale, we must have about twelve species in all, many of them very perfect and in the height of fructification. While we seem to have outstripped North Eastern India in *Cyclopteris* and several other vegetable remains,

we are decidedly behind in regard to the Cycadeaceæ. The only specimen, which I have procured is a small fragment from the sandstone of Kámpti, the leaflets of which are narrower than the minutest blade of grass, that I have ever seen.

2nd. *Similarity of geological position.*—It may be supposed that, though there is a general agreement in fossils between the coal strata of Bengal and oolitic rocks here, yet their position may be slightly different. However, from all the descriptions of Bengal coal strata, to which I have had access, I have noticed that where the sandstone is present to afford materials for comparison, the tendency to bituminous and carbonaceous shales there, as here, occurs immediately under the great mass of arenaceous beds. In proof of this I need only refer to the sections given by Mr. Homfrey from* Palamow and Singrá, and to the observations made by Mr. Osborne on the supposed coal-field at Umláh ghât near Bidjeegurh.†

In conclusion I would add, that though among the Cutch oolitic strata some are evidently marine, yet from what I have seen of those in the Deccan or read of those in Bengal, I know of none of them in either of these districts that exhibit the least evidence of having been deposited in the sea or ocean: all seem to be of fresh-water origin.

* Beng. As. Soc. Journ. Vol. XI. p. 738. † Ibid. Vol. VII. p. 843.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For May, 1855.

At a meeting held on the 2nd instant at the usual hour,

Sir James W. Colvile, Kt. President, in the chair.

The minutes of the last month's proceedings were read and, after some modification, confirmed.

Presentations were received—

1. From the Right Rev. the Bishop of Victoria, forwarding through the Rev. Mr. Cuthbert, a copy of the Gospels of Luke and John, the Acts of the Apostles, and the Epistle to the Romans, in the Loochooan language, and promising soon to send St. Luke's Gospel in Japanese.

2. From J. Watson, Esq. B. C. S., two more specimens of fossil wood and leaf impressions of a species of Cycas from Rajmahal.

With reference to the specimens, Mr. Pontet of Bhagulpore states that "The Fossils are to be had at Bindrabun, a small hill south east of Terriagully—six miles; but any body wishing to find them, ought to go to the dâk stage called Shahabad and then down my road half a mile and turn to the left."

3. From Capt. Saxton, Pooree, announcing despatch of further specimens of coal from Gangpure and of iron stone from Gurjang in the Autmallie Rajah's territory.

Capt. Saxton writes as follows:—"I have to advise you of the despatch, by cart to the Calcutta Exchange, of a further supply of the "Gangpur" coal. I have also sent some iron stone, which I met with in a village (Gurjang) in the Autmallik Rajah's territory, and which, from what I learnt from the people employed in manufacturing the iron, is of a more valuable description, than what is usually found in such abundance in many parts of the Tributary Mehals of the Cuttack and S. W. Frontier Agencies. The villagers, speaking from conjecture,

say, they obtain a *fourth* of iron from this stone. This conjecture may be far out, but they seemed aware that this one was richer than that obtainable in other parts. The process of manufacture was also somewhat different. The stone goes through a preliminary process of roasting with wood fuel, and is then beaten into a *powder* for smelting with charcoal (made from saul wood) fuel in the usual manner. No flux is ever used, though lime is very abundant, all over these districts. Merchants from Cuttack and Ganjam purchase all the iron made, payment being given by advances in grain, at a rate very unfair for the manufacturer. I have sent specimens of the ore and iron in their several stages. The ore is procured in any quantity by digging immediately below the surface.

"I have also enclosed two other curious specimens. The soft red stone was strewed over a part of the large valley west of the Gangpur coal bed. I had occasion to erect a stone mound, and only that description of stone was at hand, and my mound now stands made of similar stones all streaked inside like these specimens, the streak taking different forms, corresponding more or less with the shape of the stones"

4. From the Government of the North Western Provinces through W. Mayne, Esq. Offg. Collector of Banda, eleven copper Sunnads of maffee villages in Zillah Banda.

5. From Dr. Falconer, a full and descriptive Catalogue of the Tertiary Fossils in the Society's Museum, classified, so far as the specimens admit of identification, according to the localities in which they were found and showing the names of donors.

6. From William Cobb Hurry, Esq. specimens of pottery found in Sunderbund Grant No. — by Mr. Thierry, seven feet below the surface of the ground, while digging earth to make bricks.

His Highness Mohammad Hossain Ally Ex-Ameer of Scinde, duly proposed and seconded at the last meeting, was elected an ordinary member.

The following gentlemen were named for ballot at the next meeting.

T. Thomson, Esq. M.D. proposed by Mr. Grote and seconded by the President.

J. W. Sherer, Esq. C. S. proposed by Mr. Allen and seconded by Mr. Grote.

Dr. Montgomerie, proposed (for re-election) by Lt. Lees and seconded by Dr. Boycott.

The Council submitted reports—

1. Recommending that the offer of Dr. Sprenger to edit a Geographical Treatise of the 4th Century of the Hijerah be accepted.

2. Recommending that the following offers also be accepted, viz. that of Mr. Hall, to edit the Kávaya Darsa of Dandi with the same author's Das'a Rupaka, that of Lt. Lees, to edit the Nakhbatul Fikr, and that of Mr. Hall, to bring out, in conjunction with Pundit Ramnarain, the text of the Vishṇu Puráṇa.

Regard, however, being had to the existing liabilities of the Oriental Fund, they recommended that the printing of these works be postponed till next year.

3. Submitting for the favorable consideration of the meeting, a report from the Natural History Committee, recommending the disbursement of Rs. 1500, on cases for the newly arranged Department of Tertiary Fossils, and suggesting that the Society should solicit the aid of Government for paving with Chunar stones the whole of the ground-floor of the Museum.

The following is the report of the Committee :—

"In submitting to the Council an application for a grant of money to ensure the preservation of the instructive and valuable series of fossils lately arranged by Dr. Falconer, the Committee of Natural History would suggest to the Council that the present offers a favorable opportunity for soliciting the aid of Government towards the carrying out of several measures essential to the conservation of the many valuable collections, now forming the museum.

"The principle of occasional grants to the Society for special purposes, is distinctly recognized in the following paragraph of a letter from the Honorable Court of Directors, dated 18th September, 1839.

"'The independent and useful activity of the Asiatic Society of Bengal during so long a period, entitles it justly to your consideration, and looking to it as the only institution in India, which offers any analogy to the great national libraries and museums of Europe, it is a legitimate object of public support. We therefore, approve of the aid and encouragement which you have given. We think, however, that the extent to which you have gone is fully adequate to all purposes of public utility. The Society is already in possession of a library and museum of some extent, and the additions that may be

made to either must be occasional and progressive. It does not happen in India as in Europe, that large public or private collections of a rare and valuable description are offered for sale, and all accessions which the Society will have an opportunity of acquiring must be of limited extent and incidental occurrence. From the character too of the persons who are likely to contribute to the Society's collections, it is very improbable that a pecuniary equivalent will in all cases be desired, and it seems to us, on various grounds unnecessary and objectionable to assign to the Society a permanent grant for the purpose of effecting occasional purchases. When an application from the Society comes before you for any definite outlay, it will be time enough to take into consideration the expediency of granting the particular assistance that may then be required. We shall not object to your granting to the Society funds for special purchases as occasions arise, as far as may be compatible with a due regard to public economy. On all such occasions you will forward to our Museum a selection from the articles which may have been so procured.'

"Your Committee deem that one of the most important requirements of the Museum is a pavement of Chunar stone in the basement story. The necessity for such a pavement arises from the Museum being thrown open to the public, who frequent it in considerable numbers, constantly wearing the floor and unavoidably giving rise to clouds of dust which materially injure the specimens.

"It is in the freedom of access that the Society offers an analogy to the national museums of Europe, and by throwing open to the public the rich stores of Natural History, collected from all parts of Asia, contributes to the growth and spread of science and education among the natives and residents of India. On these grounds the Committee consider themselves warranted in soliciting the assistance of Government, the remedying of the great evil now complained of by the substitution of Chunar stone pavement for the present very inefficient one of lime and bricks.

"The Committee submit an estimate amounting to Co.'s Rs. 1500 for eight glazed cases which they consider absolutely necessary for the preservation of the fossil remains, in the order in which they have been arranged by Dr. Falconer; an order which, if once destroyed, it is doubtful if any man in India could restore, they therefore urge

upon the Council to sanction this expense great as it appears, that the labours and scientific knowledge devoted to this arrangement, be not lost.

"As connected with it, they would recommend the printing of the catalogue of these fossils ;—a most masterly and erudite description of all the specimens, the publication of which will reflect no less credit upon the Society than upon its author Dr. Falconer."

W. E. Baker,
M. Boycott,
G. G. Spilsbury,
A. C. Macrae,
A. Grote.

The recommendations were adopted.

The Council also submitted a recommendation to the effect that the thanks of the Society be offered to the following gentlemen for the Meteorological information which, in compliance with a request made by M. Leverrier of the Paris Observatory and circulated by the Council, they have furnished to the Secretary for transmission to Paris :—

Sir R. C. Hamilton, Bart., Indore. Sir H. Lawrence, K. C. B. at Mount Aboo. Major Hollings, Shahpore. Mr. Edgeworth, Jullundur. Mr. Purdon, Dilur. Mr. C. Gubbins, Allighur. Dr. Fayrer, Lucnow. Major G. Ramsay, Nepal. Major H. B. Edwards, Peshawur. Capt. Elliott, Nagpore. Major Phayre, Rangoon. Capt. Hopkinson, Akyab. Lt.-Col. Jenkins, Gowhatty. Dr. Duka, Comillah. Dr. Withecombe, Darjiling. Babu Rádhanáth Sikdar, Calcutta.

The Council further reported that they have allowed to the Librarian a commission of 10 per cent. on the proceeds of books sold from the Library.

The several recommendations having been put to the meeting *seriatim* were carried.

In compliance with the notices given at the last meeting, Mr. Honstoun asked to have laid before the meeting all notes or comments relating to the introduction or cancelment of any introduction to No. 80 of the Bibliotheca Indica.

The President stated that there were objections to the production of these papers and declined to produce them. He further stated that no passage in the introduction in question had been cancelled.

Mr. Houstoun next proposed that the Society request Mr. H. V. Bayley to accept the Joint Secretaryship of the Asiatic Society, but on the President pointing out that there being no vacancy in the Council such a procedure would be against the rules of the Society, he withdrew the motion.

Mr. Houstoun then wanted to know what communications are, as a matter of course and in what stage, to be laid before the Society, and for what communications the Society must depend upon the Council?

The President, in reply, referred him to Bye-laws 64, 77, 78 and 79.

Mr. Houstoun also wished to know by whose advice and authority the niche has been made in the Society's meeting-room to the obstruction of a proper circulation of air.

The Secretary stated that the niche had been built and the cast of Sir P. Cautley's bust placed there with the sanction of the Council.

Communications were received—

1. From E. Blyth, Esq. submitting a report on a zoological collection from the Somáli country.

2. From Capt. Tickell, the description of a new species of Buceros from Tenasserim.

3. From B. H. Hodgson, Esq. Comparative Vocabulary of the languages of the broken tribes of Nepal.

The Secretary exhibited to the meeting MS. of a Limboo work supposed to be the only work extant in that character, belonging to Capt. Mainwaring and kindly left by that gentleman for exhibition.

The Librarian and Curator of the Zoological Department submitted their usual monthly reports.

Report for May Meeting, 1855.

Our gatherings for the last month consist of

1. The collection from the Somáli country made by Lt. Speke, of the 46th N. I., and forwarded to the Society by Lt. Burton, in command of the expedition into that region. Upon this I have elsewhere reported.

2. We have received two packages of bird-skins, from Lt. Alex. J. Trotter, of the Bengal Artillery, Peshâwur. The most remarkable specimens are the European Rook (Corvus frugilegus), which was previously observed in Afghanistan by Capt. Hutton,—the Passer salicicolus (Vieillot, v. *hispaniolensis*, Tem.), also obtained in Afghanistan by Capt. Hutton,—and Emberiza esclavonica, Brisson (v. *E. pithyornis*,

Pallas, and *E. albida*, nobis), previously obtained by Capt. Hutton in the Tyne range between Masuri and Simla. The European Jackdaw (Corvus monedula), as well as the Rook, occurs at Peshâwur; and the former of these is very common in Kashmir.*

3. Babu Rajendra Mallika. A dead Monkey, Macacus cynomolgos.

4. J. Uvedale, Esq. A small snake, which fell down from a cocoa-nut tree in the neighbourhood. The species appears to be undescribed, and may rank as

Dipsas hexagonotus, nobis. Specimen evidently quite young; but well distinguished from the common D. trigonata by a series of broad hexagonal scales, commencing at the occiput and continued along the whole back. The lateral scales (towards the abdominal plates) are distinctly grooved. Head as in D. trigonata and various affined species. Colour of specimen bright ruddy-ferruginous, inclining to coral-red; paler below, and mottled with black bordering some of the scales of the upper-parts. Head green, the throat white, and the labial plates posterior to the eye yellow: a slight blackish occipital streak. Scutæ 247: scutellæ 126 pairs. Rows of scales 21. Length of specimen 18 in., of which tail 4 in. It probably grows to a large size, and may become wholly green.

We take this opportunity to remark, that we are at present in temporary possession of a fine living specimen of the Grus australasiana, Gould (or 'Native Companion' of the Australian colonists); which, until recently, was supposed to be identical with Gr. antigone, (L.), or the Indian *Sâras* or *Surhuns*. Mr. Gould's figure of it, in the 'Birds of Australia,' is far from being one of his best. The Australian Crane has much more of the aspect of Gr. vulgaris, Pallas; but is considerably larger, with the head bare and papillose to just below the conspicuous patch of grey ear-coverts, and a dewlap-like throat-wattle or pendulous lappet of skin (of a black colour with red or carneous anterior edge), which is

* In a letter dated April 22nd, Lt. Trotter remarks—"I observe that those flights of Passer salicicolus have begun again this month; and I am afraid that their appearance is a sign of the approaching hot weather. They fly in large flocks towards sunset, in every direction, and turn about all at one time." Again, after a visit to Kohat, he writes—"I saw immense flocks of Passer salicicolus at Kohat, where it is called the 'Kabul Sparrow.' They roost in thousands on the trees there, and we fired once or twice at them, and knocked over upwards of 50 at one shot. I even heard that 117 had been brought down at a single shot." Lt. H. M. Drummond, of H. M. 42nd Regt., notices the highly gregarious character of this species in Barbary, where it is the common House Sparrow of the country. *Vide Ann. Mag. N. H.* XVI, 107.

peculiar and characteristic. In Gr. antigone, the red papillose skin of the neck extends down about 4 in. below the grey ear-coverts, which form a smaller patch than in the Australian bird. Both species have the crown slaty, and bright orange-yellow irides; but as seen from a little distance, the Australian shews conspicuously a crimson occiput with contrasting black throat-wattle, the cheeks being of a paler red; while the Indian exhibits a much greater extent of crimson on the neck and throat, with some black bristle-like plumes on the throat, occiput, and upper part of the neck, more or less developed in different individuals. The legs of the Australian species are shorter than in Gr. antigone; being of the same proportions and of the same dusky slate-colour as in Gr. Vulgaris: whereas those of Gr. antigone are crimson-roseate. The tarsi, in Gr. antigone, measure 12 to 12½ in.; in our specimen of Gr. australasiana, but 10¼ in. The latter has the plumage uniformly ash-grey, with the lengthened tertiaries neither curled as in Gr. vulgaris, nor albescent as in Gr. antigone. In the *vivarium* of Babu Rajendra Mallika, there are, at the present time, several dozens of Gr. antigone, and also of Gr. vulgaris and of Gr. virgo; and we remark that about the month of April all of the first species (or *Sáras*) assume a broad pure white collar immediately below the crimson papillose skin of the neck: they then illustrate the *Gr. torquata*, (Latham), Vieillot, which accordingly is merely Gr. antigone in its nuptial plumage. We have known instances of the *Sáras* breeding in captivity, when a pair is allowed the range of a large walled garden (protected from Jackals), containing shallow inundated enclosures for the growth of rice: in these the nest is commenced under water, and raised for some inches above the surface; and the eggs are two in number, about 3¾ in. long by 2½ in. broad, of a bluish-white with a few distantly placed rufous specks and blotches. The young follow their parents from the first (unlike those of the ARDEADÆ), and have the head and neck *clad with feathers* of a dull light ferruginous colour, which begin to fall when the bird is more than half-grown. Besides the three Indian species of Crane here mentioned (of which the *Sáras* alone is known to breed in the country), a fourth occurs as a great rarity in the N. W., the Gr. leucogeranos, Pallas (white, with black primaries, bald face, and pinkish-red legs). This fine species was procured by Burnes in Afghánistán; and we have been assured that it has been occasionally observed in Rájastán. Schlegel even gives Bengal as a habitat (which we cannot but think requires confirmation, even though skins may have been received *viâ* Bengal)! A fifth Asiatic Crane exists in Gr. montagnesia, (C. L. Bonap.), from Mantchuria; a sixth in Gr. vipio, Pallas, which chiefly inhabits the extreme east, as the Corea, Japan, &c.; and there is

even another in Japan (besides also Gr. vulgaris),—the Gr. monacha of Temminck.*

We may also here notice, that we have received from Robt. F. Tomes, Esq., of Welford (near Stratford-on-Avon), a large number of most carefully taken descriptions of the specimens of Indian Bats and Shrews in the British Museum and that of the Hon'ble E. I. Company in London; the actual specimens upon which Dr. Horsfield and Dr. J. E. Gray have founded and named sundry species. As regards the Shrews, Mr. Tomes has *independently* arrived at several conclusions identical with those expressed in the Memoir on the Indian species of Shrew, published *ante*, p. 24 *et seq.*: and, with reference to the Crossopus himalayicus, Gray (p. 37 *ante*), he writes—"The specimen has the same dentition as Sorex cærulescens; but the teeth appear to me to have been pushed into the mouth from the outside, and no doubt belong to some other animal,—the skull having been removed, and these teeth introduced to conceal it [!] It is a good species; and, I think, has the tail ciliated, but having been slit up along the under-part by the skinner, it is difficult to determine." He also remarks that "Sorex caudatus, Hodgson, is certainly very closely allied to S. alpinus of Europe, if not identical with it" (vide also p. 37 *ante*). Our Soriculus (p. 36) is probably identical with Blaria, Gray. Mr. Tomes believes S. cærulescens and *S. indicus* to be "of one species. S. murinus," he adds, "is also very nearly allied, but has the fur much longer and of a much browner colour, and it looks coarser. S. Griffithii" (apparently *murinus* apud nos, not the Malayan murinus), "is evidently distinct, having a totally different kind of fur, larger teeth, and different dimensions. S. niger of Elliot is a miniature of V. Griffithii, but with a long and slender tail. All of these are of the same type as S. cærulescens."†

* For a Conspectus of the species of Crane, *vide* the Prince of Canino in the *Comptes Rendus*, XL, 720 (April 2nd, 1855).

† The following is a new species of typical Sorex, recently received from Capt. Berdmore, of Schwe Gyen, Pegu.

S. fuliginosus, nobis. Length of adult female (taken out of spirit) $5\frac{1}{2}$ in., of which tail $2\frac{1}{4}$ in.: foot *plus* $\frac{5}{8}$ in. Skull exactly 1 in. long, and $\frac{7}{16}$ in. in greatest diameter: length of series of upper teeth $\frac{7}{16}$; and breadth of palate $\frac{1}{8}$ in. Soles bare to the heel. Tail with seventeen vertebræ, and perhaps a minute eighteenth at tip; the scattered long hairs upon the tail small and fine. Fur dense, porrect, somewhat velvety; dark slaty at base, the rest fuliginous-brown, with inconspicuous dull hoary tips: beneath scarcely (if at all) paler. A second specimen merely differs in having a trifle smaller.

As Mr. Tomes will probably edit a reprint of the Memoir referred to, it is unnecessary to go further into detail here with the Shrews; and with regard to the Bats, as we hope to prepare a similar Memoir on the Indian species of this ordinal group, it will suffice, in the present instance, to note a few identifications of some interest.

Mr. Tomes remarks, that—"Specimens of PLECOTUS, and of BARBASTELLUS, from Nepal, forwarded by Mr. Hodgson to the museum of the Hon'ble E. I. Company, are *perfectly identical* with examples of the same genera from my own collection, taken here [in England], and which are now placed by the side of the Indian specimens in Dr. Horsfield's case." (*Vide* also *J. A. S.* XXI, 360). We have also minutely and carefully compared European and Masuri specimens of SCOTOPHILUS SEROTINUS and Sc. LEISLERI (v. *dasycarpus*), and can detect no difference whatever; the latter species varying in shade of colour. *Vesp. labiata*, Hodgson, does not appear to have been, as yet, properly compared with the European NOCTULINIA ALTIVOLANS; in other words, sufficiently good specimens of each have not hitherto been compared together: but there seems to be little doubt of their identity. MYOTIS MURINUS of Masuri accords minutely with the *descriptions* of the European species: and perhaps V. PALLIDIVENTRIS, Hodgson, may yet prove identical with the European M. PIPISTRELLUS; so far as we can judge from specimens of the former, presented to the Society's museum by Mr. Hodgson, but unfortunately in bad condition, there is no difference whatever in size and structure from the European PIPISTRELLUS; but the fur of M. PALLIDIVENTRIS would seem to be more ruddy (and tending to *vinaceous*) above, and also more albescent on the lower-parts. Two affined but distinct species exist in M. PARVIPES, nobis (*J. A. S.* XXII, 581), from Masuri, and M. THEOBALDI, nobis (*pallidiventris* apud nos, *ibid.*), from Kashmir. The latter is remarkable for the comparative great size of its foot, which with claws measures $\frac{7}{16}$ in.; and for its non-rufous dark dull brown fur above, and more or less albescent on the lower-parts.

E. BLYTH.

LIBRARY.

The following books have been added to the library since the 3rd of April last.

Presented.

Natuurkundig Tijdschrift voor Nederlandsch Indië, Vol. VII. Nos. 5 and 6, and Vol. VIII. Nos. 1 and 2.—BY THE EDITORS.

The Journal of the Indian Archipelago, Vol. VIII. Nos. 7 to 9, 2 copies.—BY THE GOVERNMENT OF BENGAL.

Selections from the Records of the Bengal Government, Nos. XV. XVII. and XIX. two copies each.—By the Same.

Reports with Proceedings and Appendix of the Committee appointed by Government to enquire into the State of River Hooghly, foolscap, folio.—By the Same.

Report on the Settlement in the district of Kangra in the Trans-Sutledge States, by G. C. Barnes, 4 copies.—By the Chief Commissioner of the Punjab.

The Indian Annals of Medical Science, No. 4.—By the Editor.

The Oriental Christian Spectator, No. 3.—By the Editor.

The Calcutta Christian Observer, for April, 1855.—By the Editors.

Proceedings of the Royal Society, No. 8.—By the Society.

The Oriental Baptist, No. 100.—By the Editor.

The Upadeshak, No, 100.—By the Editor.

Exchanged.

The London, Edinburgh and Dublin Philosophical Magazine, No. 57.

Purchased.

Comptes Rendus, Nos. 1 to 5 of 1855.

The Edinburgh Review, No. 205.

Journal des Savants pour Janivar, 1855.

Biblische Legenden der Muselmáner, von Dr. T. Weil, *Frankfort*, 1845, 12mo.

Ra'jendrala'l Mittra.

May 1*st*, 1855.

For June, 1855.

At the usual monthly general meeting of the Society held on the 6th instant,

Sir James W. Colvile, Kt. President, in the chair.

The minutes of the last month's Proceedings were read.

Mr. Houstoun objected to certain passages in the record and which he pointed out as incorrect. On the minutes being confirmed, he handed in a protest in the following terms; viz. "I protest against this record being taken as a true and correct account of the proceedings of the Society."

Presentations were received—

1. A collection of oolitic and tertiary fossils from Rev. S. Hislop and Rev. R. Hunter, with a few of the latter from W. W. Rawes, Esq. Madras Medical Service and Capt. Macauley, 23rd Regt. M. N. I.

The following is an extract from a letter dated 5th April last, from Mr. Hislop, which announced his intention to send these fossils.

"In an account of the proceedings of your last meeting (March 7th,) I was glad to notice the addition to your Museum of a fossil stem and leaves of Cycas from the Rajmahal hills, presented by Mr. Watson —also the announcement, by Captain Saxton, of the discovery of fossils in the Gungpore Rajah's territory. We have from here several stems, more especially in the laminated sandstone underlying, what used to be called in Peninsular India, the diamond sandstone, the former of which is the equivalent near the city of Nagpore of the coal fields in the North of this Province, and on the banks of the Damuda and other parts of Bengal. If you could kindly obtain an outline drawing of the stem for me to compare with those here, I should feel much obliged to you. Could you also give me some idea, either by a drawing or written descriptions, of the genera of the Gungpore fossils? If you have in your Museum any other Indian sandstone and coal organisms over and above those published by McClelland in his geological survey, I should be much indebted to you, if you would have the goodness to favour me with a sketch of them for the purpose of comparison. What is Pustularia Calderiana, said to be found on the Damuda coal field?

"Have you got any shells from the limestone found in connexion with the trap of the Rajmahal Hills which Capt. Sherwill considers a fresh water deposit?

"As a sort of specimens of the rough sketches that would be useful to me I send you some hasty outlines of several of the fossils discovered here in our laminated sandstone and coal. Besides these Jurassic remains, which all appear to indicate fresh water deposit, we meet in a lacustrine stratum, generally underlain and overlain with trap, with an abundance of tertiary organisms, such as small bones, fish scales, the elytra of beetles, Entomostraea and Mollusca; and fruits, seeds, leaves, roots, and trunks of trees. These are, for the most part, so minute and numerous that it would take longer time to copy them for you, than I am able to afford. My colleague, the Rev. Mr. Hunter and myself have had packed up in a box for the last year a selection of oolitic and tertiary fossils for your Museum, but we have not been able to hear of any convenient mode of transmission to Calcutta."

2. From J. Pontet, Esq. Rajmahal, impressions of Ferns *(Pecop-*

teris, Tæniopteris) of Ptilophyllum, casts of stems, &c. in soft earthy sandstone, from Bindrabun, N. W. corner of Rajmahal Hills.

3. From Her Majesty's Government through the late Sir H. Dela-Beche, the volumes hitherto published of Memoirs of the Geological Survey of Great Britain and of the Museum of Practical Geology, British Organic Remains, Records of the School of Mines, &c. and Dr. L. Playfair's Essay on Industrial Instructions on the Continent.

Capt. James, who kindly took charge of these books from Sir H. Dela-Beche states:

"Sir Henry informed me that he was sorry he was not empowered to send a set of the beautiful Geological Maps which belong to these Memoirs, but he at the same time told me he had no doubt they would be furnished to the Asiatic Society of Bengal, if an application to that effect were made to the Lords of the Treasury by the Court of Directors.

"I therefore beg to propose, on account of the great interest attaching to these valuable Maps, that a letter be addressed to the Hon'ble the Court of Directors on the part of the Asiatic Society of Bengal, requesting that the Court will apply to Her Majesty's Government for a set of the Geological Survey Maps of the United Kingdom, to be placed in the Library of the Society."

4. From R. H. Maddocks, Esq. Deputy Commissioner, Gurudaspúr, four copper coins from a trove of thirty discovered in digging the foundation of a jail at Gurudaspúr. Three of the coins are of the reign of Sikandar Sháh Behlol of Delhi, and the fourth is illegible.

5. From Col. Goodwyn, two copies of a lecture delivered at the Bethune Society, being a project for the incorporation of a Society of Arts and Sciences in Bengal.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members.

T. Thompson, Esq. M. D. F. R. S.

J. W. Sherer, Esq. B. C. S.

Dr. W. Montgomerie, B. M. S. (re-elected).

The following were named for ballot at the next meeting:—

W. S. Atkinson, Esq. Principal of la Martiniere,—proposed by Mr. Beadon and seconded by Mr. Grote.

T. C. Loch, Esq. B. C. S.—proposed by Mr. Riddell and seconded by Mr. Allen.

Mr. Houstoun gave notice of the following motion for the next meeting.

"That I may be allowed to see and have access to all papers, the property of the Society."

The Council submitted reports.

1. Recommending that Mr. Hall's offer to edit the Aphorisms of the Nyáya with the Commentary of Rishi Vátsyáyana, for publication in the Bibliotheca Indica, be accepted.

2. Stating that they have elected, subject to the confirmation of the Society under the 60th Byelaw, Dr. Spilsbury, a Vice-President, and Mr. H. V. Bayley and Capt. James, members of the Council, in the room of Col. Baker and Capt. Thuillier resigned.

The recommendations were approved and adopted.

The President, after noticing the death and public services of Major-General Forbes, proposed "that the Society record its regret at the loss of one who for many years had been a valuable member, and was formerly one of the Vice-Presidents of the Society."

Resolved accordingly.

Communications were received—

1. From J. J. Grey, Esq. Malda, enclosing a paper pointing out a simple method of manipulation in the Calotype process.

2. From Bábu Rádhánath Sikdár, forwarding abstracts of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1854, and Jan. and Feb. 1855.

The Secretary then read the following correspondence which had taken place between the Government and the Council.

No. 1237.

From the Under-Secretary to the Government of Bengal,
To the Secretary to the Asiatic Society.
Dated Lt.-Governor's Camp, Raneegunge, Zillah West Burdwan, the 3rd March, 1855.

[General.] "Sir,—I am directed to state that the Lt.-Governor, on the occasion of his recent visit to Rhotas, has observed with much regret that the remains of the old Palace there, in which the people of the whole surrounding country feel the liveliest and most unaffected in-

terest are, although the unquestioned property of Government, rapidly going to decay and that unless measures be taken to preserve them, they will certainly before long fall into irretrievable dilapidation.

"I am therefore desired to request that the Council of the Asiatic Society will favour the Lt. Governor with such information as they may possess on the subject of these ruins, and with an opinion as to whether their history and character is such as to warrant the Government in expending a moderate sum for their preservation.

I have, &c.

(Signed) H. Pratt,

Under-Secretary to the Government of Bengal."

From the Secretary to the Asiatic Society,
To the Secretary to the Government of Bengal.
Dated the 7th April, 1855.

Sir,—I am directed by the Council of the Asiatic Society to acknowledge the receipt of Mr. Under-Secretary Pratt's letter, dated the 3rd ultimo, No. 1237, and in reply to express on behalf of the Society the gratification which they derive from this announcement of his Honor's interest in the antiquities of the country.

Nearly all that is known of the history of the ruins on Rhotasgurh is compiled in the account of them given by Buch. Hamilton, published in the first Vol. of Martin's Eastern India. The stratagem by which the hill was first wrested from its Hindu Chief is narrated by Stewart in his history of Bengal.

A translation of the Sanscrit inscriptions dated 1631, over the *Kothoutiya Gate* of the Fort will be found in Vol. 8 of our Society's Journal, but the authenticity of the Genealogy contained in the inscriptions has never yet been satisfactorily worked out.

I am desired to add that, in the Society's opinion, all the standing ruins at Rhotas are well deserving of the attention of Government, and to express the pleasure with which they will co-operate, if permitted, in any measures which His Honor may take for preserving them from further dilapidation.

I have, &c.

(Signed) A. Grote,

Secretary, Asiatic Society of Bengal.

The Secretary also exhibited to the meeting a portfolio of Entomological drawings placed at his disposal for the purpose, by Mr. R. W. G. Frith. The drawings represented the transformation of various Indian Lepidoptera, and were beautifuly executed by a native artist, Moonshi Zainoolabdeen, who had been for some years employed by Mr. Frith.

From H. Piddington, Esq. submitting a twenty-fourth Memoir on the Law of Storms.

The Librarian submitted his usual monthly report.

LIBRARY.

The following have been the additions to the Library since the last meeting.

Presented.

A descriptive Catalogue of Bengali works, containing a classified list of fourteen hundred Bengali Books and Pamphlets. By the Rev. J. Long, *Calcutta*, 1855, 12mo.—BY THE AUTHOR.

On some species of Amomum, collected in Western Tropical Africa, by Dr. Daniell, by J. D. Hooker. Pamphlet.—BY THE AUTHOR.

Introductory Essay to the Flora of New Zealand, by J. D. Hooker, London, 1853, 4to.—BY THE AUTHOR.

On the Functions and Structure of the Rostellum of Listera ovata, by J. D. Hooker, 4to p.—BY THE AUTHOR.

On a new species of Volkamannia, by J. D. Hooker, 8vo. p.—BY THE AUTHOR.

Chants Populaires de l'Inde, traduits par M. Garcin de Tassy, *Paris*, 1854, Rl. 8vo. Pamphlet.—BY THE AUTHOR.

Selections from the Records of the Government of India, No. VII. Punjab Road Report, Calcutta, 1854, 8vo.—BY THE GOVERNMENT OF INDIA.

Selections from the Records of Government of the North Western Provinces. No. XIX.—BY THE GOVERNMENT, N. W. P.

Selections from the Records of the Madras Government, No. X. Report on the Operations of the Indian Mints.—BY THE GOVERNMENT OF MADRAS.

The Cyclones of the Black Sea, by H. Piddington. *Calcutta*, 1855, 8vo. Pamphlet.—BY THE AUTHOR.

On a new method of keeping open the bed of the Ganges, by H. Piddington, Esq., *Calcutta*, 1855, 8vo. Pamphlet.—BY THE AUTHOR.

Proceedings of the Royal Society, Vol. VII. Nos. 9,10.—BY THE SOCIETY.

The Oriental Christian Spectator for April, 1855.—By the Editor.

The Oriental Baptist for May, 1855.—By the Editor.

The Calcutta Christian Observer for May, 1855.—By the Editors.

Report of the Anjuman Islamy, 8vo. Pamphlet, Persian.—By the Mauluvi Abdur Rauf.

Bibidhártha Sangraha, No. 35.—By the Editor.

Tattwabodhiní Patriká, No. 112.—By the Tattwabodhiní Sabha'.

Durbín, a Persian newspaper for April, 1855.—By the Editor.

Memoirs of the Geological Survey of Great Britain and of the Museum of Economic Geology, *London*, 1854, 3 vols. 8vo.—By J. H. Dela Beche.

Records of the School of Mines, Vol. I. p 2.—By the same.

Prospectus of the Metropolitan School of Science applied to Mining and the Arts.—By the same.

Museum of Practical Geology. Industrial Instruction on the Continent, by Lyon Playfair, *London*, 1852, 8vo. p.—By the same.

Purchased.

The Annals and Magazine of Natural History, Feb. 1855.

Ra'jendrala'l Mittra.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1855.

Latitude 22° 33′ 1″ North, Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Level of the Sea 18.11. feet

Daily Means, &c. of the Observations, and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Faht.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	30.110	30.203	30.046	0.157	67.0	78.6	56.6	22.0
2	.095	.193	.013	.180	69.1	79.2	60.7	18.5
3	.098	.190	.034	.156	69.7	77.6	63.6	14.0
4	*Sunday.*							
5	.068	.139	.010	.129	71.0	79.0	63.4	15.6
6	.178	.264	.121	.143	69 9	79.2	61.7	17.5
7	.176	.266	.115	.151	70.8	79.0	64.4	14.6
8	.046	.138	29.960	.178	70.4	79.6	62.4	17.2
9	29.981	.053	.925	.128	72.5	82.2	64.0	18.2
10	30.040	.126	.995	.131	74.1	83.8	68.3	15.5
11	*Sunday.*							
12	29.998	.092	.925	.167	75.2	85.0	68.2	16.8
13	.947	.020	.889	.131	76.1	86.4	69.6	16.8
14	.935	.032	.866	.166	76.4	85.2	68.2	17.0
15	.903	29.985	.859	.126	75.3	84.2	69.4	14.8
16	.955	30.018	.895	.123	69.5	77.8	65.6	12.2
17	.964	.043	.894	.149	68.8	77.2	63.0	14.2
18	*Sunday.*							
19	.873	29.935	.790	.145	71.0	76.8	66.6	10.2
20	.889	.965	.823	.142	71.8	79.6	65.6	14.0
21	.982	30.072	.937	.135	71.5	80.2	64.0	16.2
22	.942	.030	.872	.158	72.1	81.0	62.8	18.2
23	.918	29.991	.861	.130	74.5	82.4	67.8	14.6
24	.962	30.029	.908	.121	75.4	84.2	68.8	15.4
25	*Sunday.*							
26	30.040	.137	.987	.150	76.5	86.2	67.6	18.6
27	.023	.122	.956	.166	75.3	86.0	65.0	21.0
28	.006	.089	.938	.151	76.4	86.8	66.4	20.4

Abstract of the Results of the Hourly Meteorological Observations, taken at the Surveyor General's Office, Calcutta, in the month of February, 1855.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon. *(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	61.4	5.6	58.0	9.0	0.489	5.41	1.89	0.741
2	65·5	3.6	63.7	5.4	.591	6.52	.26	.838
3	66.7	3.0	65.2	4.5	.621	.84	.09	.863
4	*Sunday.*							
5	67.2	3.8	65.3	5.7	.623	.85	.40	.830
6	66.5	3.4	64.8	5.1	.613	.76	.22	.847
7	66.9	3.9	64.9	5.9	.615	.77	.43	.826
8	65.9	4.5	63.6	6.8	.590	.48	.62	.800
9	68.6	3.9	66.6	5.9	.651	7.12	.51	.825
10	70.5	3.6	68.7	5.4	.697	.61	.46	.839
11	*Sunday.*							
12	70.5	4.7	68.1	7.1	.684	.44	.93	.794
13	71.4	4.7	69.0	7.1	.704	.65	.98	.794
14	70.8	5.6	68.0	8.4	.681	.41	2.31	.762
15	68.3	7.0	64.8	10.5	.613	6.68	.72	.711
16	64.8	4.7	62.4	7.1	.567	.24	1.64	.792
17	65.1	3.7	63.2	5.6	.582	.41	.30	.831
18	*Sunday.*							
19	68.3	2.7	66.9	4.1	.657	7.22	.03	.875
20	67.7	4.1	65.6	6.2	.630	6.92	.53	.819
21	66.0	5.5	63.2	8.3	.582	.39	.99	.763
22	66.6	5.5	63.8	8.3	.593	.50	2.03	.762
23	68.7	5.8	65.8	8.7	.634	.91	.27	.753
24	71.2	4.2	69.1	6.3	.706	7.69	1.74	.815
25	*Sunday.*							
26	69.1	7.4	65.4	11.1	.626	6.80	2.95	.697
27	67.0	8.3	62.8	12.5	.574	.24	3.16	.664
28	68.1	8.3	63.9	12.5	.595	.46	.26	.665

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1855.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Height of the Barometer at 32° Faht.	Range of the Barometer for each hour during the Month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the Month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	30.006	30.205	29.844	0.361	68.7	73.0	61.4	11.6
1	29.996	.184	.840	.344	68.1	72.8	60.4	12.4
2	.986	.186	.838	.348	67.5	72.8	60.0	12.8
3	.978	.184	.828	.356	67.2	72.2	59.4	12.8
4	.972	.173	.823	.350	66.5	71.8	58.8	13.0
5	.978	.175	.836	.339	66.1	71.0	58.0	13.0
6	.999	.199	.852	.347	65.6	70.2	57.2	13.0
7	30 025	.214	.888	.326	65.3	69.6	56.6	13.0
8	.056	.240	.919	.321	67.6	72.6	60.4	12.2
9	.078	.253	.902	.351	70.6	77.4	64.6	12.8
10	.087	.266	.906	.360	73.6	79.9	67.8	12.1
11	.073	.247	.923	.324	76.1	81.8	69.3	12.5
Noon.	.048	.219	.904	.315	78.4	83.6	69.6	14.0
1	.014	.183	.860	.323	79.8	85.4	71.8	13.6
2	29.986	.165	.836	.329	80.8	86.8	74.8	12.0
3	.965	.145	.803	.342	81.2	86.8	73.4	13.4
4	.955	.136	.793	.343	80.6	86.4	69.0	17.4
5	.950	.131	.795	.336	79.3	85.4	69.6	15.8
6	.957	.145	.790	.355	76.5	82.0	68.5	13.5
7	.976	.181	.813	.368	74.5	78 8	68 2	10.6
8	.997	.197	.837	.360	73.0	77.2	68.0	9.2
9	30.011	.207	.853	.354	71.7	75.0	66.1	8.9
10	.017	.209	.865	.344	70.8	74.0	65.6	8.4
11	.014	.210	.868	.342	70.1	73.5	65.4	8.1

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1855.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid-night.	66.3	2.4	65.1	3.6	0.619	6.83	0.86	0.888
1	66.0	2.1	64.7	3.4	.611	.76	.79	.895
2	65.6	1.9	64.5	3.0	.607	.72	.70	.906
3	65.3	1.9	64.2	3.0	.601	.65	.70	.905
4	64.6	1.9	63.5	3.0	.588	.51	.68	.905
5	64.5	1.6	63.5	2.6	.588	.51	.59	.917
6	64.1	1.5	63.2	2.4	.582	.46	.54	.923
7	63.9	1.4	63.1	2.2	.580	.44	.49	.929
8	65.3	2.3	63.9	3.7	.595	.58	.86	.884
9	67.0	3.6	65.2	5.4	.621	.84	1.31	.839
10	68.5	5.1	65.9	7.7	.636	.95	.98	.778
11	69.6	6.5	66.3	9.8	.644	7.01	2.62	.728
Noon.	70.4	8.0	66.4	12 0	.646	.00	3.31	.679
1	70.6	9.2	66.0	13.8	.638	6.88	.87	.640
2	70.7	10.1	65.6	15.2	.630	.79	4.28	.613
3	70.5	10.7	65.1	16.1	.619	.67	.54	.595
4	70.0	10.6	64.7	15.9	.611	.58	.43	.598
5	69.9	9.4	65.2	14.1	.621	.72	3.87	.635
6	69.5	7.0	66.0	10.5	.638	.92	2.83	.710
7	69.1	5.4	66.4	8.1	.646	7.06	.12	.769
8	68.5	4.5	66.2	6.8	.642	.02	1.74	.801
9	68.0	3.7	66.1	5.6	.640	.01	.42	.832
10	67.8	3.0	66.3	4.5	.644	.08	.12	.863
11	67.4	2.7	66.0	4.1	.638	.02	.01	.874

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1855.

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the sky.
	o	Inches.		
1	132.5		S. W. or W.	Cloudless and slightly foggy during the day.
2	130.0		Calm or S.	Cloudless till 9 A. M. scattered ∩i afterwards.
3	132.5		S. or S. E.	Scattered _i or \i till 6 A. M. cloudless till 11 A. M. scattered ∩i or _i afterwards.
4	*Sunday.*			
5	128.2		E. or S.	More or less cloudy the whole day.
6	134.0	0.74	E. or variable.	Cloudy till 6 P. M. also rain, lightning and thunder between midnight and 8 A. M. cloudless after 6 P. M.
7	130.0		N. E. or N. W.	Cloudless nearly the whole day.
8	131.5		Calm or W. or S.	Ditto.
9	136.2		S. or S. E.	Cloudless till 6 A. M. various clouds till 5 P. M. cloudless afterwards.
10	139.0		S.	Cloudless till 2 A. M. various clouds till 6 P M. cloudless afterwards.
11	*Sunday.*			
12	137.0		S. or S. W.	Cloudless nearly the whole day.
13	136.0		S.	Cloudless till 7 A. M. scattered \i and _i afterwards.
14	135.2		S. or S. W.	Cloudy till 6 A. M. cloudless till 10 A. M. scattered \i and _i till 4 P. M. cloudless afterwards.
15	135.2		S. W. or W.	Cloudless till 6 A. M. scattered _i or \i till 3 P. M. cloudless afterwards.
16	..		Calm or W. or N. W.	Cloudless till 5 A. M. cloudy afterwards, also drizzling between 4 and 5 P. M.
17	115.0		W. or S. W.	Scattered _i till 8 A. M. cloudy afterwards with drizzling between 4 and 5 P. M.
18	*Sunday.*			
19	..	0.37	W. or S. S. E. or S.	Cloudy and raining till 8 A. M. only cloudy 7 P. M. cloudless afterwards.
20	134.0		S. or N. W.	Cloudless till 9 A. M. various clouds till 8 P. M. cloudless till 11 P. M.
21	134.0		N. W. or W.	Cloudless till 9 A. M. scattered \i till 6 P. M. cloudless afterwards.
22	132.0		S. W. or W.	Cloudless till 5 A. M. various clouds afterwards.
23	138.0		S. W. or W. or S.	Cloudless till 7 A. M. cloudy til Noon, scattered _i afterwards.
24	136.0		S.	Cloudless till 5 A. M. scattered ∩i till 7 P M. cloudless afterwards.
25	*Sunday.*			
26	140.0		S. or N. or W.	Cloudless.
27	140.2		S. W. or N. W or S.	Scattered _i.
28	140.0		S. or W. or N.	Scattered _i.

\i Cirri, _i Cirro-strati, ∩i Cumuli, ∼i Cumulo-strati, _i Nimbi, —i Strati, \ i Cirro cumuli.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1855.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.984	30.059	29.922	0.137	75.9	87.7	65.4	22.3
2	.972	.042	.890	.152	77.0	86.9	67.2	19.7
3	30.057	.131	.999	.132	71.8	74.2	69.2	5.0
4	*Sunday.*							
5	.019	.106	.955	.151	76.6	86.7	67.8	18.9
6	29.991	.069	.923	.146	78.1	85.9	70.8	15.1
7	.972	.045	.906	.139	77.5	88.0	70.5	17.5
8	.893	29.970	.821	.149	78 4	89.4	68.0	21.4
9	.854	.917	.796	.121	80.2	91.0	72.5	18 5
10	.849	.936	.775	.161	78.3	87.8	70.6	17.2
11	*Sunday.*							
12	.960	30.048	.908	.140	79.0	87.8	70.8	17.0
13	.961	.050	.884	.166	78.5	88.4	68.6	19.8
14	.863	29.945	.786	.159	78.6	89.2	69.8	19.4
15	.801	.876	.732	.144	79.1	87.1	72.8	14 3
16	.887	.984	.788	.196	74 6	82.6	70.4	12.2
17	.940	30.034	.885	.149	71.8	79.7	67.4	12.3
18	*Sunday.*							
19	.885	29.980	.801	.179	77.3	88.7	66.2	22.5
20	.796	.876	.719	.157	77.9	89.2	67.2	22.0
21	.738	.814	.666	.148	79.3	91.2	66.9	24.3
22	.761	.838	.699	.139	81.1	91.6	71.8	19.8
23	.788	.856	.716	.140	81.6	90.6	75.2	15.4
24	.804	.900	.729	.171	81.8	91.6	74.8	16.8
25	*Sunday.*							
26	.810	.889	.749	.140	83.2	93.5	76.2	17.3
27	.818	.891	.747	.144	84.5	94.4	76.2	18.2
28	.817	.906	.739	.167	84.7	95.3	77.4	17.9
29	.799	.874	.722	.152	84.3	96.4	75.6	20.8
30	.767	.864	.683	.181	85.1	96.7	77.4	19.3
31	.760	.831	.680	.151	84.5	94.0	79.8	14.2

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1855.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon. *(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	67.9	8.0	63.9	12.0	0.595	6.47	3.10	0.676
2	69.5	7.5	65.7	11.3	.632	.87	.02	.695
3	68.2	3.6	66.4	5.4	.646	7.10	1.35	.840
4	*Sunday.*							
5	70.8	5.8	67.9	8.7	.679	.37	2.40	.754
6	72.4	5.7	69.5	8.6	.715	.74	.48	.757
7	71.7	5.8	68.8	8.7	.699	.57	.47	.754
8	71.0	7.4	67.3	11.1	.666	.21	3.10	.699
9	74.4	5.8	71.5	8.7	.763	8.23	2.65	.756
10	72.0	6.3	68.8	9.5	.699	7.56	.72	.735
11	*Sunday.*							
12	71.5	7.5	67.7	11.3	.674	.30	3.20	.695
13	70.8	7.7	66.9	11.6	.657	.11	.24	.687
14	72.8	5.8	69.9	8.7	.725	.84	2.54	.755
15	73.3	5.8	70.4	8.7	.736	.95	.58	.755
16	70.2	4.4	68.0	6.6	.681	.42	1.78	.807
17	68.9	2.9	67.4	4.4	.668	.33	.12	.867
18	*Sunday.*							
19	68.3	9.0	63.8	13.5	.593	6.42	3.56	.643
20	68.3	9.6	63.5	14.4	.588	.37	.79	.627
21	69.5	9.8	64.6	14.7	.609	.58	4.01	.621
22	73.8	7.3	70.1	11.0	.729	7.85	3.32	.703
23	75.4	6.2	72.3	9.3	.783	8.43	2.91	.743
24	75.6	6.2	72.5	9.3	.787	.47	.93	.743
25	*Sunday.*							
26	77.6	5.6	74.8	8.4	.849	9.11	.78	.766
27	77.4	7.1	73.8	10.7	.822	8.78	3.57	.711
28	74.7	10.0	69.7	15.0	.720	7.69	4.73	.619
29	75.7	8.6	71.4	12.9	.761	8.13	.15	.662
30	78.0	7.1	74.4	10.7	.838	,95	3.62	.712
31	79.4	5.1	76.8	7.7	.905	9.67	2.68	.783

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1855.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Midnight.	29.881	30.037	29.744	0.293	74.8	80.8	69.8	11.0
1	.871	.030	.743	.287	74.1	80.6	69.0	11.6
2	.857	.017	.734	.283	73.6	80.1	68.2	11.9
3	.846	.007	.716	.291	73.0	80.2	67.0	13.2
4	.843	.001	.701	.300	72.5	80.0	66.6	13.4
5	.859	.015	.731	.284	72.0	79.8	66.2	13.6
6	.876	.030	.746	.284	71.7	79 8	65.4	14.4
7	.899	.067	.771	.296	71.8	80.4	65.6	14.8
8	.929	.097	.795	.302	75.3	82.6	68.6	14 0
9	.945	.110	.814	.296	78.5	86.2	70.6	15.6
10	.952	.131	.814	.317	81.8	89.0	70.3	18.7
11	.942	.122	.809	.313	84.0	91.4	70.8	20.6
Noon.	.913	.098	.766	.332	86.2	94.1	71.7	22.4
1	.882	.088	.735	.353	87.5	95.2	72.9	22.3
2	.849	.070	.698	.372	88.2	96.4	73.0	23.4
3	.825	.057	.679	.378	88.6	96.4	74.2	22.2
4	.812	.021	.667	.354	88.2	96.7	73.4	23.3
5	.809	.038	.666	.372	86.4	94.2	72.7	21.5
6	.812	.048	.675	.373	83.5	90.2	71.8	18.4
7	.829	.051	.690	.361	80.8	86.6	71.6	15.0
8	.849	.074	.708	.366	79.1	83.4	70.9	12.5
9	.871	.068	.727	.341	77.7	82.4	70.2	12.2
10	.883	.081	.740	.341	76.8	82.0	70.0	12.0
11	.879	.071	.743	.328	75.9	81.2	69.2	12.0

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1855.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Midnight.	71.1	3.7	69.2	5.6	0.708	7.72	1.54	0.834
1	70.7	3.4	69.0	5.1	.704	.68	.39	.847
2	70.3	3.3	68.6	5.0	.695	.59	.34	.850
3	69.9	3.1	68.3	4.7	.688	.52	.24	.858
4	69.8	2.7	68.4	4.1	.690	.56	.07	.876
5	69.2	2.8	67.8	4.2	.677	.42	.08	.873
6	69.1	2.6	67.8	3.9	.677	.42	.01	.880
7	69.2	2.6	67.9	3.9	.679	.45	.00	.882
8	70.9	4.4	68.7	6.6	.697	.58	.82	.806
9	72.4	6.1	69.3	9.2	.711	.69	2.66	.743
10	73.5	8.3	69.3	12.5	.711	.63	3.77	.669
11	74.1	9.9	69.1	14.9	.706	.55	4.62	.620
Noon.	74.6	11.6	68.8	17.4	.699	.45	5.54	.574
1	74.9	12 6	68.6	18.9	.695	.38	6.11	.547
2	75.4	12.8	69.0	19.2	.704	.47	.29	.543
3	76.1	12.5	69.8	18.8	.722	.65	.27	.550
4	75.9	12.3	69.7	18.5	.720	.63	.13	.555
5	75.4	11.0	69.9	16 5	.725	.71	5.35	.590
6	74.6	8.9	70.1	13.4	.729	.82	4.18	.652
7	74.0	6.8	70.6	10.2	.741	.99	3.08	.722
8	73.2	5.9	70.2	8.9	.732	.91	2.62	.751
9	72.6	5.1	70.0	7.7	.727	.87	.23	.779
10	72.2	4.6	69.9	6.9	.725	.87	1.96	.801
11	72.0	3.9	70.0	5.9	.727	.90	.67	.825

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1855.

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	140.4	..	S. or S. W. or N. or N. W.	Scattered —i or \i till 9 A. M. cloudless afterwards.
2	135.4	..	N. or E. or S.	Cloudless till 5 A. M. scattered —i afterwards.
3	..	..	S. W. or N. W. or S. E.	Cloudy the whole day, also occasionally drizzling.
4	*Sunday.*			
5	137.0	..	Variable.	Cloudless till 1 P. M. scattered ~i.
6	137.0	..	S.	Scattered \i and —i or ~i till 8 P. M. cloudless afterwards.
7	137.6	..	S. or S. W. or N. W.	Cloudless nearly the whole day.
8	136.8	..	W. or S. W.	Cloudless till 5 A. M. scattered —i and \i till 3 P. M. cloudless afterwards.
9	137.5	..	N. W. or N.	Cloudless.
10	137.0	..	W.	Cloudless till 6 A. M. cloudy till 6 P. M. cloudless afterwards.
11	*Sunday.*			
12	139.0	..	S. or N. or W.	Cloudless.
13	139.5	..	N. W. or N.	Cloudless till noon scattered \i till 7 P. M. cloudless afterwards.
14	136.5	..	N. W. or S. W. or S.	Cloudless till 5 A. M. various clouds afterwards.
15	..	..	S. or W.	Cloudless till 5 A. M. cloudy till 7 A. M. cloudless afterwards.
16	..	..	S. or W. or S. W.	Cloudless till 6 A. M. cloudy afterwards also drizzling at 5 P. M.
17	120.0	..	S. W. or W.	Cloudy till 4 P. M., also drizzling from 9 A. M. to 11 A. M. cloudless, after 4 P. M.
18	*Sunday.*			
19	144.0	..	S. or W. S. W.	Cloudless.
20	141.5	..	S. W. or N. W. or S.	Cloudless.
21	140.9	..	W. or S.	Cloudless.
22	138.5	..	S. or S. W.	Cloudless till noon, more or less cloudy afterwards.
23	134.0	..	S. W. or S. or S. E.	Cloudy till 10 A. M. cloudless till 7 P. M. cloudy afterwards.
24	143.7	..	S. or S. W.	Cloudy.
25	*Sunday.*	0.14		
26	143.0		S. or S. W.	Cloudless nearly the whole day.
27	136.0	..	S. or S. W.	Cloudless till 1 P. M. scattered —i afterwards.
28	137.3	..	S. or S. W.	Cloudy till 7 A. M. various clouds afterwards. Scattered —i till 8 A. M. cloudless afterwards.
29	146.5	..	S. or W.	
30	149.0	..	S. or W.	Cloudless till 3 P. M., cloudy afterwards.
31	137.0	..	S. or S. W.	Cloudy nearly the whole day.

\i Cirri, ~i Cumuli, —i Strati \—i Cirro-cumuli, —i Cirro-strati, ~—i Cumulo-strati, \—i Nimbi.

Meteorological Observations kept at the Residency, Lucknow. Lat. 26 51.18, *Long.* 81 *for the Month of August*, 1854.

Date.	At 6 A. M.					At 9 P. M.					Noon.				
	Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer		Barometer.	Force and direction of Wind.	Aspect of Sky.
	Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.			
1	..	..	..	....	....	82	86	29.50	..	....	80	86	29.52	S.E.F. variable	Hazy : rain.
2	81	84	.45	N. lt.	Cumuli.	83	89	.51	S. E. lt.	Cumuli.	..	..	..	thunder	....
3	79	82	.42	Ditto.	Ditto.	83	89	.52	Ditto.	Ditto.	82	90	.51	S. E. lt.	Cumuli.
4	80	84	.45	S. E. lt.	Cirro-cumuli.	81	85	.58	E. lt.	Ditto.	81	89	.48	N. E. lt.	Ditto.
5	81	85	.46	S. W. lt.	Cirri.	82	87	.55	Ditto.	Ditto.	..	..	..	..	....
6	80	83	.52	....	Cumulo-strati	81	84	.56	S. E. lt.	Strati.	82	85	.52	S. E. lt.	Cumulo-strati.
7	81	83	.44	Ditto.	Ditto.	82	85	.50	Ditto.	Ditto.	83	85	.48	W. lt.	Strati : rain.
8	80	83	.40	Ditto.	Cirro-strati.	81	84	.45	W. lt.	Ditto.	..	..	..	..	....
9	80	83	.40	W. lt.	Ditto.	81	83	.45	Ditto.	Strati : rain.	81	83	.48	W. lt.	Strati : rain.
10	78	81	.45	Ditto.	Strati.	81	82	.53	S. W. lt.	Strati.	..	..	..	..	....
11	80	81	.45	S. lt.	Ditto.	81	83	.50	S. lt.	Ditto.	82	85	.46	S. W. lt.	Cumulo-strati.
12	80	81	.44	Light.	Cirro-strati.	81	83	.48	Ditto.	Rain.	82	86	.50	..	Cirro-cumuli.
13	80	82	.45	Ditto.	Cumulo-strati	81	83	.48	W. lt.	Strati.	82	86	.50	Calm.	Cumuli.
14	80	83	.48	S. lt.	Cirro-strati.	80	83	.55	S. W.	Cumulo-strati.	82	84	.54	S. lt.	Cumulo-strati.
15	80	82	.52	Calm.	Ditto.	81	83	.58	S. lt.	Ditto.	82	84	.60	S. E. lt.	Strati : rain.
16	80	81	.56	Ditto.	Strati.	81	82	.60	N. W. lt.	Rain.	81	84	.62	S. W. lt.	Strati.
17	..	..	..	....	....	80	82	.68	N. E lt.	Strati.	80	83	.64	W. lt.	Rain.
18	78	80	.62	W. lt.	Cirro-cumuli	80	83	.68	W. lt.	Cumulo-strati.	..	..	..	..	....
19	79	81	.62	Ditto.	Ditto.	81	82	.68	Ditto.	Ditto.	..	..	..	..	....
20	80	82	.58	Ditto.	Ditto.	82	84	.68	S. W. lt.	Ditto.	81	84	.65	W. lt.	Cumulo-strati.
21	81	82	.60	S. E. lt.	Ditto.	81	84	.68	E. lt.	Ditto.	..	..	..	..	....
22	..	..	..	....	....	83	85	.64	S. lt.	Lt.-rain:strati.	..	..	..	..	....
23	80	82	.54	N lt.	Strati : rain.	81	82	.58	N. lt.	Rain.	81	82	.61	N. lt.	Rain.
24	77	79	.50	S. W. f.	Rain.	..	..	..	..	....	79	81	.54	S. W. lt.	Ditto.
25	78	80	.54	S. W. lt.	Ditto.	..	..	..	..	....	80	84	.60	Ditto.	Cumuli.
26	78	80	.62	S. W.	Cirro-strati.	81	84	.72	W. lt.	Cirri.	82	87	.63	W. lt.	Cirri.
27	79	82	.64	S. W. lt.	Clear.	81	86	.72	Ditto.	Clear.	82	89	.69	Ditto.	Clear.
28	79	83	.60	W. lt.	Ditto.	..	..	..	..	....	80	96	.66	W. lt. F.	Ditto.
29	79	84	.58	Ditto.	Cirri.	80	86	.68	Ditto.	Clear.	81	91	.64	W. lt.	Ditto.
30	81	84	.62	Ditto.	Ditto.	..	..	..	..	....	83	91	.66	S. W. lt.	Cirro-cumuli.
31	83	86	.64	S. lt.	Ditto.	83	89	.68	S. lt.	Clear.	83	92	.68	S. E. lt.	Ditto.
Total.	2232	2303	.1459	....	....	2191	2280	.1565	..	....	1872	1981	1276	..	....
Averg.	79.714	82.250	29.520	....	....	81.148	84.444	29.581	..	....	81.391	86.130	29.580	..	....

Meteorological Observations kept at the Residency, Lucknow. Lat. 26-51-18, *Long.* 81 *for the Month of August,* 1854.

At 3 P. M.					At 6 P. M.						
Thermometer.		Baro-meter.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Baro. meter.	Force and direction of Wind.	Aspect of Sky.	Rain Guage Inches.	Remarks.
Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.					
80	84	.42	N. lt.	Cumulo-strati.	80	83	.40	Calm.	Cumulo-strati.	1.60 at noon.	
83	90	.42	E. lt.	Cirro-cumuli.	82	85	.45	Lt. E.	Ditto.	.10	Shower at P. M.
82	89	.44	S. lt.	Cumuli.	82	88	.42	Ditto.	Cumuli	.5	Thunder and rain at 6 P. M.
81	89	.48	E. lt.	Ditto.	81	89	.44	Lt. S. E.	Cirro-cumuli.	.2	
83	88	.48	N. lt.	Ditto.	82	88	.44	Ditto.	Cumuli.	1.5	Light rain at intervals.
82	85	.45	S. E. lt.	Cumulo-strati.	82	85	.45	S. E, lt.	Cumulo-strati.	1.	Heavy rain early morning, rain during
82	85	.38	S. W. lt.	Rain.	82	85	.38	W. lt.	Cumulo-strati.	.1	Ditto. [the day.
..	..	..	..	....	..	..	..	....	....	.1	Light rain all yesterday during the [night.
80	82	.42	W. lt.	Rain.	80	83	.42	W. lt.	Strati.	.5	
81	84	.45	Ditto.	Cumuli.	81	83	.45	Ditto.	Cumulo-strati.	.05	
82	86	.42	S. E. lt.	Cumulo-strati.	80	84	.41	Ditto.	Ditto.	.05	No rain registered, very light rain has
82	85	..	Ditto.	Cumuli.	..	..	..	....	....	.2	Showery. [fallen.
..	..	..	..	....	..	..	..	....	....	.0	Light rain, none registered.
82	85	.48	W. lt.	Cumuli.	..	..	..	. ..	....	.05	Light shower. [of yesterday.
82	84	.54	S. lt.	Strat : irain.	..	..	..	....	....	.50	Very light rain during the afternoon
..	..	..	..	....	79	81	.38	S. lt.	Rain.	1.55	Gentle rain all yesterday and during
80	84	.62	Lt.	Strati.	81	83	.60	S. W. lt.	Cumuli.		[the night.
..	..	..	..	....	..	..	..	....	....	....	Occasional light shower.
81	84	.58	W. lt.	Cumulo strati.	..	..	..	....	....		
..	..	..	..	....	..	..	..	....	....	....	Rain in this afternoon.
..	..	..	..	....	82	85	.38	S. lt.	Cumuli.	1.00	Light rain frequently during the day.
81	85	.58	N. lt.	Cumulo-strati.	..	..	..	....	....	.05	
80	82	.56	W. lt.	Ditto.	..	..	..	....	....	.05	Rain all day.
79	81	.50	S. W. lt.	Ditto.	..	..	..	....	....	4.90	Heavy rain during night.
80	85	.56	W. lt.	Cumuli.	..	..	..	....	....	5.80	Rain all night.
82	88	.66	Lt.	Ditto.	80	86	.62	W. lt.	Cumuli.		
..	..	..	..	....	..	..	..	....	....		
..	..	..	..	....	..	..	..	....	....		
80	91	.58	W. lt.	Cirri.	81	90	.58	W. lt.	Clear.		
81	91	.62	S. lt.	Cirro-cumuli.	81	90	.60	S, lt.	Cirri.		
84	91	.62	S. E. lt.	Cumuli.	..	..	..	....	....	....	Light shower of rain at 2½ P. M.
1870	1978	1126	..	....	1295	1368	.742	....	....	19.80	.....

Abstract of the Meteorological Register for August, 1854.

Lucknow, 1st September, 1854.

	Thermometer 6 A. M.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer 6 P. M.		
	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.
Wet,..	83	77	79.714	83	80	811.48	83	79	81.391	84	79	81.304	82	79	80.937
Dry,..	86	79	82.250	89	82	84.444	96	81	86.130	91	81	86.230	90	81	85.500

	Barometer 6 A. M.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer. 6 P. M.		
	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.
	29.64	29.40	29.520	29.72	29.45	29.581	29.69	29.46	29.580	29.66	29.38	29.489	29.62	29.38	29.464

Remarks.

Prevailing winds this month, S. E. and W. but generally variable. Weather cloudy.
Rain fell on 21 days. The heaviest fall on the 24 and 25.
Total quantity 19.18.
The atmosphere of course damp and loaded with moisture.
Mean temperature of the month, S. West 80.899.
Ditto Dry 84.911.

J. FAYRER, M. D., F. R. C. S.

Meteorological Observations kept at the Residency, Lucknow. *Lat.* 26-51-18. *Long.* 81, *for the Month of September*, 1854.

Date.	At 6 A. M.					At 9 A. M.					Noon.				
	Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.
	Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.			
1	83	86	29.65	S. W. lt.	Cirri.	83	90	29.70	S. E. lt.	Cumuli.	..	..	..	..	....
2	80	83	.65	E. lt.	Cumulo-strati.	..	..	..	..	....	82	88	29.68	S. E. lt.	Cumuli.
3	80	83	.68	W. lt.	Ditto.	83	87	.72	S. W.	Cumuli.	83	87	.70	Ditto.	Ditto.
4	82	85	.66	S. E. lt.	Cirri.	83	87	.70	S. E. lt.	Ditto.	83	89	.70	Ditto.	Ditto.
5	82	85	.60	Ditto.	Ditto.	..	..	..	..	....	82	87	.62	Ditto.	Ditto.
6	82	85	.62	Ditto.	Cirro-cumuli.	83	88	.68	S. E. lt.	Cumuli.	82	88	.62	Ditto.	Ditto.
7	80	84	.62	S. E. F.	Cumulo-strati.	81	85	.68	S. lt.	Ditto.	..	..	..	..	....
8	80	83	.58	E. lt.	Ditto.	..	..	..	..	....	81	88	.56	S. E. F.	Cumuli.
9	81	84	.56	S. E. lt.	Cirri.	81	86	.62	N. E. lt.	Cirro-cumuli.	81	89	.58	S. E. F.	Ditto.
10	80	84	.68	E. lt.	Cirro-cumuli.	81	86	.72	S. lt.	Cumuli.	81	89	.72	E. lt.	Ditto.
11	81	84	.68	Ditto.	Cirri.	82	88	.72	S. E. lt.	Cirri.	80	91	.73	S. E. lt.	Ditto.
12	81	84	.65	Ditto.	Clear.	81	86	.68	Ditto.	Cumuli.	..	..	..	..	....
13	80	84	.48	Ditto.	Cirro-strati.	79	82	.48	E. F.	Strati: rain.	80	85	.44	S. E. lt.	Cumuli.
14	77	80	.32	S. E. lt.	Strati: rain.	78	80	.38	S. lt.	Ditto.	78	82	.38	Ditto.	Strati: rain.
15	77	78	.52	W. lt.	Cirro-cumuli.	..	..	..	..	....	..	..	..	..	....
16	77	80	.68	Ditto.	Cumulo-strati.	79	83	.70	N. W. lt.	Cirro-cumuli.	80	85	.68	W. lt.	Cumuli.
17	76	79	.66	Ditto.	Clear.	..	..	..	..	....	80	85	.70	S. W. lt.	Ditto.
18	78	81	.70	S. W. lt.	Cirro-strati.	80	84	.78	S. W. lt.	Cirro-cumuli.	80	84	.72	Ditto.	Strati: lt. rain.
19	78	80	.72	E. lt.	Clear.	80	83	.78	Ditto.	Clear.	82	87	.76	Ditto.	Cumuli.
20	80	82	.78	W. lt.	Ditto.	81	85	.82	Ditto.	Ditto.	..	..	..	..	....
21	80	82	.80	Ditto.	Ditto.	..	..	..	..	....	82	89	.85	W. lt.	Clear.
22	78	80	.82	E. lt.	Cumulo-strati.	79	83	.92	S. E. lt.	Cirri	81	88	.86	S. E. lt.	Cumuli.
23	79	82	.82	S. E. lt.	Clear.	81	85	.85	S. lt.	Clear.	82	88	.86	Calm.	Clear.
24	..	..	..	..	....	80	86	.88	S. E. lt.	Ditto.	..	..	..	..	....
25	79	82	.82	S. E. lt.	Clear.	81	88	.94	Ditto.	Ditto.	..	..	..	..	....
26	77	81	.82	Ditto.	Cirro cumuli.	77	83	.92	Ditto.	Cumuli.	..	..	..	..	....
27	73	78	.78	N. E. F.	Cirro-strati.	..	..	..	..	....	75	78	.80	N. W. F.	Rain.
28	74	76	.82	S. E. lt.	Strati.	..	..	..	..	....	77	80	.86	S. E. lt.	Cumuli.
29	75	77	.82	Ditto.	Cumulo-strati	77	80	.88	S. E. lt.	Cumuli.	78	82	.86	Ditto.	Ditto.
30	76	78	.78	Ditto.	Cumuli.	70	82	.86	Ditto.	Ditto.	79	84	.85	Ditto.	Ditto.
Total.	2286	2370	1977	..	....	1690	1867	1641	..	....	1769	1893	1553	..	....
Averg.	78.828	81.724	29.682	..	....	80.476	84.864	29.746	..	....	80.409	86.045	29.706	..	....

At 3 P. M.					At 6 P. M.						
Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.	Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.	Rain Guage Inches.	Remarks.
Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.					
81	86	29.62	S. E. F.	Cumulo-strati.	83	87	29.38	S. E. lt.	Cumuli.	..	Heavy squall of wind and rain with thunder @ 2 P. M. to 3 P. M.
83	90	.60	S. E. lt.	Thunder-rain-[cumuli.	82	88	.62	Ditto.	Ditto.	.9	
..	..	..	..	....	83	88	.65	Ditto.	Cirro-cumuli.	1 6	Heavy rain last night with thunder-Showers.
..	..	..	..	....	..	..	..	..	...	.2	
83	89	.58	S. E. lt.	Cumuli.	82	88	.60	Lt.	Cirro-cumuli	.2	Ditto. [storm.
..	..	..	..	....	..	..	..	..	....	..	
80	89	.52	S. E. F.	Cumuli.	..	..	..	..	....	..	Fresh breezes during the day.
81	89	.54	E. lt.	Ditto.	81	86	.58	S. E. lt.	Cumulo-strati.	..	Ditto.
..	..	..	..	....	..	..	..	..	....	0.2	Shower at 6 P. M.
80	90	.62	S. E. lt.	Cumuli.	81	91	.61	S. E. lt.	Cumuli.	..	
80	90	.54	Ditto.	Ditto.	..	..	..	..	....	..	
80	83	.46	S. E. F.	S.-heavy-rain.	79	83	.44	E. lt.	Strati.	0.6	Rain at 4 P. M. [and lightning.
80	83	.38	W. lt.	Cumuli.	..	..	..	..	....	5.7	Heavy rain all night with thunder
78	85	.58	N. E. lt.	Clear.	80	85	.62	N. E. lt.	Cumuli.	0.2	Light rain yesterday.
79	85	.62	W. lt.	Cirri.	79	85	.62	W. lt.	Clear.	.3	
81	86	.66	S. W. lt.	Cumuli.	..	..	..	..	....		
80	83	.70	Ditto.	Cumulo-strati.	..	..	..	..	....	.1	Rain at 2 P. M.
81	87	.73	Ditto.	Cumuli.	82	86	.72	S. W. lt.	Cirro-cumuli.		
82	87	.74	Ditto.	Clear.	82	86	.75	Ditto.	Clear.		
..	..	..	..	....	82	88	.80	W. lt.	Ditto.		
..	..	..	..	....	88	86	.78	S. E. lt.	Ditto.	0.2	Light rain and thunder in the night.
..	..	..	..	....	..	..	..	..	....		
..	..	..	..	....	..	..	..	..	....		
78	84	.84	S. E. lt.	Cirri.	..	..	..	..	....		[ning yesterday at 6 P. M.
76	84	.84	E. F.	Cumuli.	73	82	.85	F.	Cumuli.	0.1	Shower with squall of wind light-
..	..	..	..	....	74	77	.78	E. lt.	Strati : lt. rain.	.05	Fresh gale during the night from
78	80	.80	S. E. lt.	Cumuli.	..	..	..	..	....	.50	E. and N. E.
78	82	.80	Ditto.	Ditto.	..	..	..	..	....	.20	
78	84	.85	Ditto.	Ditto.	..	..	..	..	....		
1597	1716	1302	..	....	1211	1286	980	..	....	11.05	....
79.850	85.800	29.615	..	....	80.733	85.733	29.653	..	....	..	....

Abstract of the Meteorological Register for September, 1854.

Lucknow, 1st October, 1854.

	Thermometer 6 A. M.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer 6 P. M.			Remarks.
	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	
Wet,..	83	73	78.828	83	77	80.476	83	75	80.409	83	78	79.850	88	73	80 733	Prevailing winds this month S. E. but frequently variable and light. Rain fell on 15 days
Dry,..	86	76	81.724	90	80	84.864	91	78	86.045	90	80	85.800	91	77	85.733	The heaviest fall on the 3 and 14. Total quantity of rain 11.05. The atmosphere damp. The weather close and oppressive being generally overcast with Cumuli, &c.
	Barometer 6 A. M.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer 6 P. M.			Mean temperature of the month Wet bulb. .... 80.056.
	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Dry, ... 84.833.
	29.82	29.32	29.682	29.94	29.38	29.746	29.86	29.38	29.706	29.85	29.38	29.615	29.85	29.38	29.653	

J. FAYRER, M. D. F. R. G. S.

ERRATA.

Page	line	
308	13	*for* "Su-Newe" *read* "Su-mwe."
—	34-35	*for* "tassi" *read* "tapi."
309	1-2	*for* "tassi" *read* "tapi."
—	4-5	*for* "inteo" in three places *read* "mteo."
—	29	*for* "M-angu" *read* "M-anga."
311	17	*for* "bu" *read* "bri."
—	21	*for* "huv-ge" *read* "bui-ge."
312	6	*for* "So lung" *read* "So hing."
—	21	*for* "cha-lung" *read* "cha-hing."
—	30	*for* "Nya" *read* "Nyo."
—	32	*for* "tap pe ke ku chenema" *read* "tappe ke ku chenena."
313	17	*for* "Mum" *read* "Nunu."
—	23	*for* "Egj" *read* ": e. g."
—	31	*for* "kai apai" *read* "kai dpai."
314	2	*for* "klan" and "klau kapluk" *read* "klau" and "klau kaplak."
—	23	*for* "kadun" *read* "kadnu."
—	25	*for* "Si kamcheng kadun" *read* "Ti kancheng kadnu."
—	32	*for* "Kambum" *read* "Kambrum."